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Tenth Annual Garrett Morgan Sustainable Transportation Symposium, MTI Report S-09-06

Mineta Transportation Institute

Tenth Annual Garrett Morgan Sustainable Transportation Symposium

MTI Report S-09-06

MINETA
TRANSPORTATION INSTITUTE
Created by Congress in 1991

MINETA TRANSPORTATION INSTITUTE

The Norman Y. Mineta International Institute for Surface Transportation Policy Studies (MTI) was established by Congress as part of the Intermodal Surface Transportation Efficiency Act of 1991. Reauthorized in 1998, MTI was selected by the U.S. Department of Transportation through a competitive process in 2002 as a national "Center of Excellence." The Institute is funded by Congress through the United States Department of Transportation's Research and Innovative Technology Administration, the California Legislature through the Department of Transportation (Caltrans), and by private grants and donations.

The Institute receives oversight from an internationally respected Board of Trustees whose members represent all major surface transportation modes. MTI's focus on policy and management resulted from a Board assessment of the industry's unmet needs and led directly to the choice of the San José State University College of Business as the Institute's home. The Board provides policy direction, assists with needs assessment, and connects the Institute and its programs with the international transportation community.

MTI's transportation policy work is centered on three primary responsibilities:

Research

MTI works to provide policy-oriented research for all levels of government and the private sector to foster the development of optimum surface transportation systems. Research areas include: transportation security; planning and policy development; interrelationships among transportation, land use, and the environment; transportation finance; and collaborative labor-management relations. Certified Research Associates conduct the research. Certification requires an advanced degree, generally a Ph.D., a record of academic publications, and professional references. Research projects culminate in a peer-reviewed publication, available both in hardcopy and on TransWeb, the MTI website (http://transweb.sjsu.edu).

Education

The educational goal of the Institute is to provide graduate-level education to students seeking a career in the development and operation of surface transportation programs. MTI, through San José State University, offers an AACSB-accredited Master of Science in Transportation Management and a graduate Certificate in Transportation Management that serve to prepare the nation's transportation managers for the 21st century. The master's degree is the highest conferred by the California State University system. With the active assistance of the California Department of Transportation, MTI delivers its classes over a state-of-the-art videoconference network throughout the state of California and via webcasting beyond, allowing working transportation professionals to pursue an advanced degree regardless of their location. To meet the needs of employers seeking a diverse workforce, MTI's education program promotes enrollment to under-represented groups.

Information and Technology Transfer

MTI promotes the availability of completed research to professional organizations and journals and works to integrate the research findings into the graduate education program. In addition to publishing the studies, the Institute also sponsors symposia to disseminate research results to transportation professionals and encourages Research Associates to present their findings at conferences. The World in Motion, MTI's quarterly newsletter, covers innovation in the Institute's research and education programs. MTI's extensive collection of transportation-related publications is integrated into San José State University's world-class Martin Luther King, Jr. Library.

MTI Report S-09-06

TENTH ANNUAL GARRETT MORGAN SUSTAINABLE TRANSPORTATION SYMPOSIUM

May 2010

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On March 23, 2010, the Mineta Transportation Institute (MTI) continued its support of the U.S. Department of Transportation's Garrett A. Morgan Technology and Transportation Futures Program by conducting the Tenth National Garrett Morgan Symposium and Videoconference on Sustainable Transportation.

The ongoing mission of this national videoconference is to stimulate the minds of young people, and to encourage them to pursue challenging academic programs including mathematics and science—an education course that will prepare today's students for tomorrow's challenging transportation careers.

Participating school were: Kemps Landing Magnet School, Virginia Beach, VA; Morada Middle School, Stockton, CA; Redland Middle School, Rockville, MD; Riverside Meadows Intermediate School, Plumas Lake, CA; and Riverview Middle School, Bay Point, CA.

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Thank you to Caltrans Chief Deputy Director Cindy McKim; Caltrans Deputy Director Bijan Sartipi, District 4; Bill Millar, President, American Public Transportation Association (APTA); United States Secretary of Transportation Norman Y. Mineta (ret.) and current Secretary of Transportation Ray LaHood.

Thank you to this year's classroom sponsors and their organizations: Elaine Bradford, Caltrans District 3; Marcella Anderson, Caltrans District 10; Kimberly Ponder, Caltrans District 4; Tamara Poulson, Hampton Roads Transit; and Starleetah Gaddis amd Pamela Boswell, APTA.

Thank you to this year's participating schools, their teachers and transportation agency sponsors for contributing to the education of tomorrow's transportation industry professionals: Kemps Landing Magnet School, Virginia Beach, VA, teacher Dennis Borgerding, sponsored by Hampton Roads Transit; Morada Middle School, Stockton, CA, teacher Maria Mack, sponsored by Caltrans District 10; Redland Middle School, Rockville, MD, teacher Kimberly McLurkin-Harris, sponsored by APTA; Riverside Meadows Intermediate School seventh and eighth grades, Plumas Lake, CA, teachers Michelle Dietz and Amy DuShane, sponsored by Caltrans District 3; and Riverview Middle School, Bay Point, CA, teacher Rosemary Hatcher, sponsored by Caltrans District 4.

Sincere thanks to the technicians at each videoconference site, your technological know-how and troubleshooting allowed this coast-to-coast video-conference.

As always, MTI thanks the Honorable Norman Y. Mineta for his unwavering support for this event and for promoting the transportation industry as a viable future for young people.

For their work in producing this event and its report, thanks to the MTI staff, including Director of Communications and Special Projects Donna Maurillo, Director of Research Dr. Karen Philbrick, Student Publications Assistant Sahil Rahimi and Student Webmaster and Technical Assistant Ruchi Arya.

Transcription services were provided by Meg Dastrup of Word Power Plus, with editing and publication production services by Catherine Frazier.

Please note that all research for this symposium was performed by middle school students, and the Mineta Transportation Institute cannot verify the content accuracy of each group's presentation.

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FOREWORD

It is our pleasure to present this edited transcript from the Tenth Annual Garrett Morgan Sustainable Transportation Symposium, which was held March 23, 2010. This event is central to the Mineta Transportation Institute's ongoing goal to provide information and technology transfer. Middle school students are this event's target audience, because they are transportation's future leaders and innovators.

There is no doubt that transportation is a growth industry in both the public and private sector. Our nation has a renewed interest in improving and expanding public transportation, on repairing and improving our existing highway and rail systems, and creating modes of sustainable transportation. This will offer opportunities in all areas of transportation planning, from engineers and urban planners to policy managers and communications professionals.

Where will those talented professionals come from? No doubt, past and future participants in the Garrett Morgan Sustainable Transportation Symposium will provided a good start! Every year the projects are more original and visionary, and each year it is more difficult to select a winner! Students faced many challenges as they conceived and created their sustainable transportation entries for this competition. It compelled them to use many of the skills that are required of transportation professionals—math, physics, chemistry and other sciences, and of course, excellent communications skills.

I'm happy to congratulate all students. They met the challenge. I also to extend my personal thanks to those individuals included in the acknowledgements section. Without each of them, this educational opportunity simply would not would not have happened.

Sincerely,

Rod Diridon, Sr.

Executive Director, Mineta Transportation Institute

EXECUTIVE SUMMARY

On March 23, 2010, the Mineta Transportation Institute (MTI) continued its support of the United States Department of Transportation's Garrett A. Morgan Technology and Transportation Futures Program by conducting the Tenth Annual National Garrett Morgan Symposium and Videoconference on Sustainable Transportation. The purpose of this national videoconference is to stimulate young people's minds and encourage them to pursue the academic programs that will prepare them for professional careers in transportation engineering, planning, administration and technology.

Purpose

The Garrett A. Morgan Technology and Transportation Futures Program was established in 1997 by former U.S. Secretary of Transportation Rodney E. Slater. The program has three cornerstone components:

- To establish a partnership among the U.S. Department of Transportation, state departments of transportation, public and private transportation providers and local communities to ensure that today's students are prepared to become the next generation of transportation leaders
- To develop a curriculum that can interest younger students in transportation and provide learning tools that can guide them to advanced academic and professional levels
- To provide the technologies that will enable students to develop skills that they can apply to future careers in transportation

Participating Schools

This year's videoconference schools included:

- Kemps Landing Magnet School, Virginia Beach, VA
- Morada Middle School, Stockton, CA
- Riverside Meadows Intermediate School (two classes), Plumas Lake, CA
- Riverview Middle School, Bay Point, CA
- Redland Middle School, Rockville, MD

Event Highlights

The students were welcomed by MTI's Executive Director Rod Diridon, Sr., American Public Transportation Association (APTA) President Bill Millar, Caltrans Chief Deupty Director Cindy McKim, and MTI's Director of Communications Donna Maurillo, who moderated the event.

Mr. Diridon reminded the students of the videoconference's ultimate goal:

> Our activities today are to encourage youngsters in the area of junior high school to study hard, take technical classes in math and science in high school, so that they can take the technical courses in college that will then allow them to become eventually transportation professionals, and build our transportation systems in the future.

This year's research topics included a hybrid bus system that acts as a shuttle to larger systems; the benefits of high-speed rail; electromagnetic powered vehicles; a solar and nitrogen energy-powered airplane; turbo-powered ships, and electric-powered amphibious vehicles to reduce roadway congestion.

The presentations, in alphabetical order, are summarized as follows:

Kemps Landing Magnet School created an Integrated Hybrid Bus System (IHBS). Under the guidance of teacher Dennis Borgerding, students Celine Brass, Zach Burkart, Gary Chen, Anita Desai, Lucy Fitzgerald, Emily Gimlin, Ethan Grogan, Kevin Hu, Ashlee MacDonald, Nicole Saks, Stephen Tang, and Veronica Taylor, described a system of hybrid mini-buses designed to navigate deep into neighborhoods, acting as "shuttle buses" that facilitate connection to more extensive public transportation, including rail, light rail and municipal buses.

Redland Middle School investigated the benefits of expanding high-speed rail in the United States. Supervised by teacher Kimberly McLurkin-Harris, "High-Speed Rail in the U.S." was presented by students Malik Butler, Tyaisa Craig, Monica Dewberry, Brittany Earp, Najai Freeman, Acara Huon, Savion Jacks, Brianna Kapoor, and Kiana Williams.

Morada Middle School's "Sustainable Multi-Hybrid Transit System for the Twenty-First Century" suggested an electromagnet system of vehicles designed to eliminate the need for fossil fuels. The "Eternity" system consists of numerous vehicle types, including motorcycles, automobiles, trucks and buses that maximize the number of vehicles on the road yet allow for individual flexibility when exiting the highway. Teacher Maria Mack worked with student presenters Abdul Awnallah, Nick Peterson, Justin Tomlinson, Bryanna Turner, and Susan Yan.

Riverside Meadows Intermediate School sent two entries to the videoconference. First up were seventh grade teacher Amy DuShane's students, Hannah Shaw and Katiebeth Shivley. The students invented the Conservation Cruiser, an airplane constructed of recycled ultra-light materials that runs on solar and nitrogen power.

The school's second entry was created by a pair of teacher Michelle Deitz's eighth-grade students, Chris Gottschalk and Cesar Medina, who created the Turbo Boat. The Turbo Boat is a hydroelectric-powered, environmentally safe ship that can be used in place of today's diesel-powered ships.

Riverview Middle School's "Travel on the Bay Bridge and in the San Francisco Bay—The Big Idea" suggested the use of an electric-powered amphibious vehicle that can leave the roadway and travel on top of the waterways, saving time and bypassing the need to sit in traffic waiting to cross a bridge. With the assistance of teacher Rosemary Hatcher, student innovators Bianca Magallon, Azjah Mouton, Kyerstin Neely, Alisa Pecot, Angeleke Robinson, Nicolas Romo-Banuelos, and Danielle Stinson created a model of the Bay Bridge to show how the multi-amphibious vehicles, called MAVs, could work to reduce congestion on the Bay Bridge between Oakland and San Francisco.

A lively question and answer period followed the presentations, with classes asking questions of each other. Points were awarded to schools for the quality of their questions and answers. At the end of the session, students were addressed by retired United States Secretary of Transportation Norman Y. Mineta and current Secretary of Transportation Ray LaHood, who appeared via videoconference link from the Federal Railroad Administration site in Washington DC. Each school was allowed to ask one question from the secretaries.

The winning team was announced at a later time. Teacher Dennis Borgerding from Kemps Landing Magnet School, a student team member, and a parent will travel to California in June to attend MTI's annual scholarship banquet to accept the grand prize cash award and a plaque. The winning presentation's Power Point slides are included in this publication as Appendix A. A biography of Garrett Augustus Morgan is included as Appendix B.

The videoconference, in its entirety, can be viewed at http://www.dot.ca.gov/research/planning/garrett_morgan_symposium/garrett_morgan_program.htm.

INTRODUCTIONS

ROD DIRIDON

My name is Rod Diridon. I'm the executive director of the Mineta Transportation Institute established by Congress in 1991 and located at San José State University. We're very proud to be named after the former Secretary of Transportation, Norman Y. Mineta, who will be with us later in the program. Our activities today are to encourage youngsters in the area of junior high school to study hard, take technical classes in math and science in high school, so that they can take the technical courses in college that will then allow them to become eventually transportation professionals, and build our transportation systems in the future.

This program is named after Garrett Morgan, he's in the poster to my right. He was an African American gentleman who, in the early part of the 20th century, was a self-taught scientist and inventor. He invented the stop light that has saved millions and millions of lives by making it safer to enter and exit interchanges, along with many other things. So he should be a good role model for each of you, to recognize that you can do whatever you want to do in life, and you can accomplish wonderful things for our society in the process.

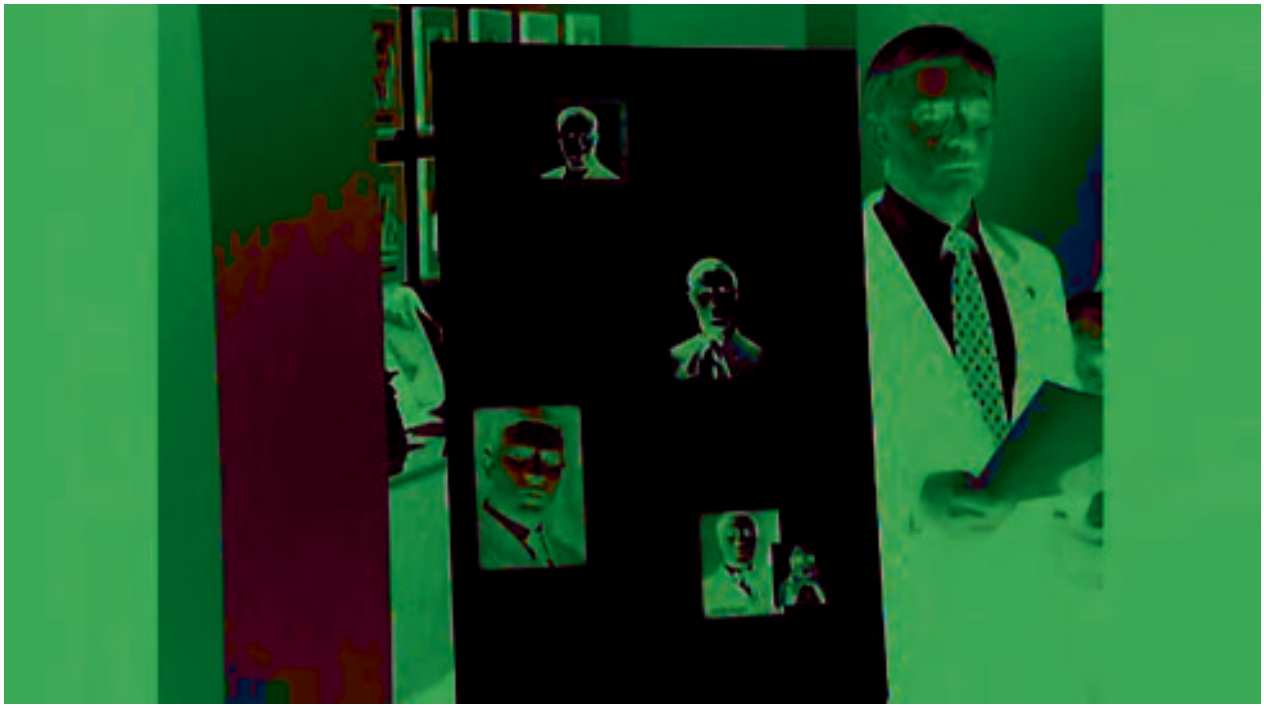


Figure 1 MTI's Executive Director Rod Diridon and a Biographical Poster of Garrett Morgan

Let me move on now by noting that the president of the American Public Transportation Association, who is one of our site sponsors, is Bill Millar. Bill is also the chair of the board of the Mineta Transportation Institute.

BILL MILLAR

Rod, thank you, and I want to welcome all of the students who are joining us today from the Atlantic to the Pacific coast in this, the tenth anniversary of the national Garrett Morgan Symposium on Sustainable Transportation. Now we're glad that all of you are with us today to talk about ways that we might keep America moving and moving forward in a more sustainable fashion and give us *your* insight into what transportation will need to be as we progress through the 21st century.

Figure 2 APTA President Bill Millar at the Washington DC Site

Now, to all the students, your participation in this event certainly shows great promise. You're obviously among the best and the brightest in the next generation of transportation leaders and we welcome you here today.

As Rod mentioned, we will have two very special guests joining us in about an hour into the presentations today. We are very honored that the current U.S. Secretary of Transportation, the Honorable Ray LaHood, will be joining us at our site here in Washington. He will be introduced by the namesake of the Mineta Institute and the founder of the Garrett Morgan program, former U.S. Secretary of Transportation Norman Y. Mineta. So I think we have a very good program laid out for us today.

ROD DIRIDON

Thank you very much, Bill, and I'll look forward to the presentations by our secretaries and the competition to come. I should note at this point that Randy Iwasaki, who is the Director of the California Department of Transportation, was unable to be with us today, but he

had his chief deputy director, a person I've known now for thirty years, Cindy McKim, who is in charge of a huge transportation system—50,000 lane miles of freeways, interstate passenger and local passenger trains, and 250 airports. Cindy is here with us today, taking her time away from administering her $14 billion annual budget, to give a welcome. Let's go now to Sacramento and hear a comment from Cindy McKim.

CINDY MCKIM

Thank you, Rod. It's a real pleasure for me to be here today. This is the first year that I've been participating in the symposium, and I just want to tell all of the kids out there that are participating that we at Caltrans look forward to welcoming you into our workforce over the next five, ten years. I think we have a very exciting program here in California, and the kinds of things that we do in transportation impact everybody in the country and have a major impact on our economy. So it's an exciting program; it's a fun program and we look forward to having you join us.

I am especially pleased to note that, of the five schools that will be making presentations today, three of them are from right here in California, and I would like to acknowledge the efforts of some of our Caltrans employees who have made this possible. Marcella Anderson from our Stockton district office, Elaine Bradford from our Marysville district office, and Kimberly Ponder from our Oakland office.

The schools that are participating: We have Morada Middle School seventh and eighth graders from Stockton, California, teacher Maria Mack, sponsored by Marcella Anderson, Caltrans District 10; Riverside Meadows Intermediate School seventh graders from Plumas Lake, California, teacher Michelle Dietz, sponsored by Elaine Bradford in Caltrans District 3; Riverside Meadows Intermediate School eighth graders, Plumas Lake, California, teacher Amy DuShane, sponsored by Elaine Bradford in Caltrans District 3; Riverview Middle School eighth graders from Bay Point, California, teacher Rosemary Hatcher, sponsored by Kimberly Ponder, Caltrans District 4; Redland Middle School sixth, seventh and eighth graders from Rockville, Maryland, teacher Kimberly McLurkin-Harris, sponsored by the American Public Transit Association; and Kemps Landing Magnet School eighth graders, Virginia Beach, Virginia, teacher Dennis Borgerding, sponsored by Hampton Roads Transit.

I would like to thank not only the sponsors, but also the teachers. I know that this takes extra time on your part, but what you are doing is God's work out there, and we really thank you for being a part of this. Congratulations to all the students and we're looking forward to hearing your presentations. Thank you.

Figure 3 Caltrans Chief Deputy Director Cindy McKim

ROD DIRIDON

Cindy, thank *you* very much, and thanks for allowing us to use your videoconference facilities here in Oakland, and the various sites in California, to conduct the program. I should note that Bijan Sartipi, the District 4 director, is with us here, and thank you, Mr. Landlord, for allowing us to use your facilities.

I'd like to move on now to introduce Donna Maurillo. Donna is the communications director for the Mineta Transportation Institute. She handles our special projects and she's the one who has coordinated this program for several years. She will be the MC for the rest of the program until we have the secretaries arrive at about 1:30. And so here is Donna Maurillo.

DONNA MAURILLO

Hi, everybody. I'm going to be speaking to you from among some of our competitors. The presentation process will go this way. We're going to do the schools in alphabetical order, starting with Kemps Landing, a magnet school from Virginia Beach. So you guys will go first and then we'll continue on in alphabetical order. You'll have 10 minutes to give your presentation. While you're doing your presentation, each of the judges will then rate you. You will be judged on your presentation, which includes overall quality, logical information flow, appropriate use of graphics, and clarity. You also will be rated on teamwork, which means how well you work as a group, how your presentation skills are and your professional demeanor, because we like students who know how to give a presentation and do it in a clever way, and also on concept. In other words, is your project sustainable, original, universally available, convenient, practical? And then your overall concept.

Figure 4 MTI's Director of Communications Donna Maurillo Explains the Judging Process to Participants

A perfect score is 150 points, but I need to let you know—nobody has ever gotten a perfect score. Some people have come really close, but, you know, don't be disappointed if you don't get a perfect, because nobody ever has.

Now, if there's time at the very end, we will have a question and answer [session], where the students can ask each other to defend their project, and so another school may ask a question about your project, and then you pick somebody who might be able to answer that question, and be able to defend the logic and the concept. You also will have an opportunity to ask questions of the secretary of transportation. Normally, we have him seated right up front, but he had a previous commitment, and will not be joining us for a little more than an hour. After he speaks you'll have the opportunity also to ask questions of him.

Are there any questions? Is everybody ready to go? Okay. Let's go to Kemps Landing Magnet School in Virginia Beach, Virginia, and they are broadcasting from the Vicom site.

CLASSROOM PRESENTATIONS

KEMPS LANDING MAGNET SCHOOL

Integrated Hybrid Bus System (IHBS)

Teacher: Dennis Borgerding

Presenters: Celine Brass, Zach Burkart, Gary Chen, Anita Desai, Lucy Fitzgerald, Emily Gimlin, Ethan Grogan, Kevin Hu, Ashlee MacDonald, Nicole Saks, Stephen Tang, and Veronica Taylor

FEMALE STUDENT

Sustainable Transportation in the 21st Century: The Kemps Landing Magnet School Integrated Hybrid Bus System.

MALE STUDENT

In America we face various problems with transportation every day and are constantly working to solve these problems. However, the simple things in life have been commonly underrated by the vast majority of people for decades. Yet, so often, these simple things are the best solutions.

Congestion is the greatest problem in transportation today. Congestion is, in many aspects, an incredibly simple problem, yet it hinders modern transportation the most. The increasing mechanization of production has brought with it the growth of small businesses, which of course is a good thing. However, if growth is not dealt with correctly, it is ultimately detrimental. This growth leads to the expansion of business districts throughout cities, which leads to more cars heading in more directions, worsening congestion even further, as no single, central point of business may be found.

Our IHBS, or integrated hybrid bus system, will solve this problem. It addresses the more commonly considered problems, such as efficiency and emissions, of course; however, it ultimately takes cars off the roads due its appealing convenience, which promotes ridership and ultimately resolves congestion.

The IHBS involves the usage of seven central locations of areas in the United States similar to the Virginia Beach, located in every corner of the city. We have designated these central locations to be significant commuting areas, as each of the central locations are noted places of business, military, or medical use. Forty-two large buses are spread out across these central locations and, after 15 years, these will be replaced by another 42 buses.

FEMALE STUDENT

The other important component of the IHBS is the shuttle-bus system. It is composed of forty 22-foot hybrid minibuses that travel into neighborhoods, coming directly to our customers in small, flexible districts to pick up passengers, allowing for the convenience of close stops for walkers and bicyclists. These bus stops are away from large roads and prevent disruptions of traffic and congestion. They pick up passengers from near their homes and transport them to the nearest main bus stop, where they may transfer to a large bus going between one of six other central locations, even branching out into other neighborhoods with minimal transfers. This provides for flexible, effective, and adaptable routes for maximum convenience, encouraging riders, and ready to be applied to cities across America which are suburban and suffer from the same problems of a sprawling city.

FEMALE STUDENT

Our map represents the two distinct routes of the IHBS. The purple represents the residential areas of the city that the shuttle buses go to. They go to the red, which represents the main route of the IHBS. There are seven main, centralized locations of the city on the red route.

FEMALE STUDENT

Hybrid technology will be used because it is extremely fuel-efficient. It uses 50,000 gallons less of diesel per year over three years. It causes fewer emissions into the atmosphere and 95 percent less particle matter, and there are 30 percent less gray chalk gases. Hybrid technology has cleaner, faster, and quicker accelerations.

MALE STUDENT

Although Virginia Beach already has a bus system, it is not as efficient as it could be, and it is very costly, and most people do not like it. The current system gets money from the federal and state government in order to pay for the buses due to the lack of riders. Riders are unhappy with the current system because of the lack of convenient stops. Riders have no way to get to the stops, and, once they are there, there is often a large time lapse before the next bus comes. The IHBS fixes these problems by increasing the bus route density and including the shuttle buses in that mix to make the stops convenient.

FEMALE STUDENT

The Integrated Hybrid Bus System fixes many of the problems the current transportation system has. First, it is sustainable. The IHBS takes cars off the road and reduces the emissions that historically would have been given off by these vehicles. It also has little emissions given off through hybrid technology.

Second, it is financially self-sustaining. The government is already supplying much aid to projects all over the country. Unlike the current transportation systems, they will self-support without a need [for financial assistance] from the state or federal government.

Third, it is convenient. The bus system in use now is not as efficient as it could be. That means very few people ride at all. The IHBS fixes this problem by reaching everywhere from central locations to individual neighborhoods, making it more accessible for every rider.

And finally, it is cheaper for everyone. The less expensive a mode of transportation is, the more people will ride it. It is cheaper [because] there is no need for each individual to pay for their own maintenance or gas for a car.

Figure 5 Kemps Landing Magnet School Students at Vicom Site

MALE STUDENT

This chart shows the expenses related to the large hybrid buses in the system. And although the cost difference between conventional and hybrid buses is large to begin with, the government covers 90 percent of this difference under the Clean Fuels grant program, making only a $20,000 difference in initial cost per bus. And then the cheaper operating costs of the hybrid bus [allow] the hybrid buses to be over half a million dollars cheaper than the conventional buses over a 30-year span.

MALE STUDENT

The following chart demonstrates the cost factors of the shuttle buses we will be using.

When we say “shuttle bus,” we refer to the ones that travel in between neighborhoods and central locations. Each one of these buses will cost $55,000. Operating each bus for one mile will cost $1.02. The annual cost for operating the routes of these buses will be $1.4 million. This means that, over 30 years, shuttle bus routes will cost $41.6 million. The 30-year total cost for buses will be $5.2 million, and the 30-year total cost for the entire shuttle bus system will be $46.8 million. Let’s state that annually. The shuttle bus system has a $1.6 million average cost.

FEMALE STUDENT

With the total annual cost of about $1.6 million for the shuttle buses, and about $3.6 million for the large buses, the total annual cost for the entire IHBS is just over $5.2 million. These numbers, however, don’t include the revenue generated by the 5.4 million tourists that visit Virginia Beach every year, and the additional profits from tourism can be used for things like research, advertisements, and expansion of the system.

FEMALE STUDENT

In order to calculate the fare, we used the daily cost of the entire bus system, and the working population of Virginia Beach. We expect that seven percent of the working population will commute using IHBS. If we succeed in only getting seven percent of the working population with an 80-cent daily fare, which allows the rider to ride all day and only pay once, we will have a net annual profit of about $470,000. We compared this to the cost of riding in a car, which we calculated to be about 50 cents per mile, once insurance, gas, and maintenance have been considered. After only two miles, we found that it was cheaper to ride IHBS. Money saved using IHBS increases as we use it more and more. This also takes millions of cars off the roads each year, reducing congestion.

MALE STUDENT

A light rail was also considered as a method of transit between the seven central locations. However, several factors dissuaded us from using light rail. The largest problem with it is the cost. The light rail currently being built in Norfolk, Virginia, is deemed the cheapest to date. However, it still has a massive price tag of over $650 million over a period of 30 years. This massive amount of money could fund the IHBS for over 100 years. It could also increase the fare, decreasing ridership, which is detrimental to the IHBS. Additionally, other factors, such as the lengthy rail construction and repairs, make the light rail an impractical method of transit.

FEMALE STUDENT

Another important aspect of any city is its families. We decided it would be important to calculate how much a family would save by using IHBS to commute. For this slide, we assume that each family has two working adults who must each own a personal vehicle if commuting by car, whereas with IHBS, only one car must be owned and seldom used, for long trips, vacations, etc.

We averaged the price of a new car over a car's lifetime, but added in the cost of maintenance and insurance, and found the family would save about $5,800 by using IHBS to commute without factoring in gas.

We then used the average price of gas in 2009 to find the total annual savings for a family. We compared the cost of [driving] a personal vehicle to commute to the cost of using IHBS, and found both daily and annual savings. We found that, for a 28-mile commute, which is about a seven mile one-way commute per adult, a family saves over $6,000 annually by using the IHBS. This $6,000 can be used for other things, and makes a huge difference to a family, especially in times like these, when money is so tight. IHBS also potentially cuts down family car ownership by 50 percent, drastically decreasing congestion, a huge problem in cities across the United States.

FEMALE STUDENT

The arguments stated in our slide show, presentation board, and our paper, all explain why IHBS would be a good transportation system for any city. It is sustainable and helps our earth. It saves consumers money. It can provide convenient transportation for both tourists and residents, and greatly decreases congestion, a huge problem everywhere in the United States. Thank you for your time, and we hope you enjoyed our presentation.

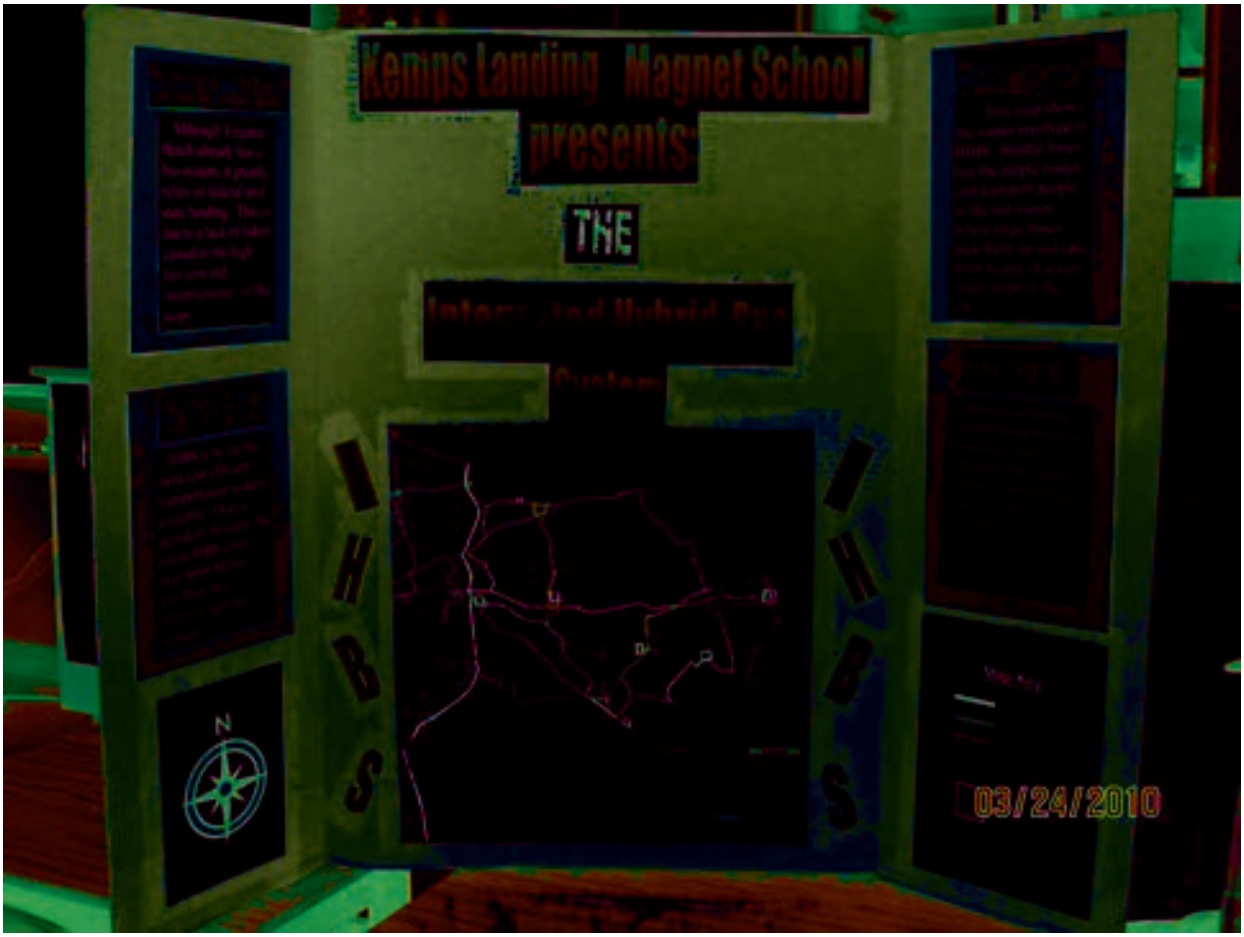


Figure 6 Kemps Landing Presentation Visual Aid

DONNA MAURILLO

Thank you very much, Kemps Landing Magnet School, with an excellent presentation.

We will move now to Morada Middle School in Stockton, California. They're broadcasting from the Caltrans District 10 site. Go ahead, Morada Middle School.

MARIA MACK

We're bringing our presentation up. We'll be right with you.

DONNA MAURILLO

Great. I might mention that we have four judges, none of whom have any stake in the outcome. None of the judges are affiliated with any of the sites or the sponsors. The judges are MTI Executive Director Rod Diridon, and MTI Research Director Dr. Karen Philbrick. Also judging is José Orozco, a UC Davis graduate student in the Sacramento Caltrans office. And I am also a judge, I am the communications director at the Mineta Transportation Institute. After the event, we will total up the scores and, within two weeks, we will let you know who has won first place. Are you ready to go? District 10.

STOCKTON TECHNICIAN

Hi. This is District 10 in Stockton. We're having trouble bringing up the presentation. Would we be able to move on to the next school, and come back to us?

DONNA MAURILLO

We can do that. We'll come back to you. Redland Middle School in Rockville, Maryland? They're broadcasting from the U.S. Department of Transportation site in Washington DC. Are you ready to go?

REDLAND MIDDLE SCHOOL

High Speed Rail in the U.S.

Teacher: Kimberly McLurkin-Harris

Presenters: Malik Butler, Tyaisa Craig, Monica Dewberry, Brittany Earp, Najai Freeman, Acara Huon, Savion Jacks, Brianna Kapoor, and Kiana Williams

FEMALE STUDENT

Good afternoon. This is our project for Sustainable Transportation in the Twenty-First Century. We are pleased to present our project for Mineta Transportation Institute, Garrett A. Morgan Symposium—High Speed Rail in the U.S.: an alternative to improve

the environment and our public transit in America. Redland Middle School, Rockville, our teacher, Mrs. McLurkin. Project objective. The project is to identify the economic benefits of a high-speed rail in the U.S.

Figure 7 Redland Middle School with Bill Millar at Podium

FEMALE STUDENT

What is “sustainable transportation?” It provides alternate modes for travel, reduces traffic congestion, and helps lead the nation toward its goals and policies of protecting the environment.

FEMALE STUDENT

This graph represents six modes of transportation. I would like to take a moment to talk, especially about high-speed rail. It fits more people and it drives faster, to take less time to get to your destination.

FEMALE STUDENT

So what are the benefits of high-speed rail, and the benefit to the environment? If you love saving the environment, but can’t find a good way of transportation, high-speed rail is for you. By riding high-speed rail, you are doing a lot about helping the environment and, in return, you get lots of different things on your ride to make it more appealing to you. For example, food service, fax machines, and places to plug in your laptop.

Do you believe that high-speed rail can combat global warming? Another good reason to ride high-speed rail is that it will decrease the risk of terrorists. You see, us buying foreign oil increases having terrorism in the U.S. If you want to help the environment or a cool way of transportation, ride high-speed rail.

FEMALE STUDENT

What is the community impact? It strengthens our economy, reduces cost of transportation, and saves time. Health benefits. Reduces air [pollutants] which decreases asthma. It preserves the community economic base and creates jobs and enhances urban areas.

FEMALE STUDENT

We would like to thank our sponsors, American Public Transportation [Association], under Mrs. [Pamela] Boswell and Mrs. [Starleetah] Gaddis and Mr. Millar. Our information came from www.highspeedrailonline.com and our partners in education. Thank you.

DONNA MAURILLO

Thank you very much. And that was Redland Middle School from [Rockville], Maryland, broadcasting from the U. S. Department of Transportation Office. Now we'll go back to Morada Middle School in Stockton. Are you able to broadcast yet?

We can see your presentation now. Can somebody help them put that in slideshow mode?

MORADA MIDDLE SCHOOL

Sustainable Multi-Hybrid Transit System for the Twenty-First Century

Teacher: Maria Mack

Presenters: Abdul Awnallah, Nick Peterson, Justin Tomlinson, Bryanna Turner, and Susan Yan

MALE STUDENT

Okay. So are we ready? Good morning, everybody.

SUSAN YAN

Our team is proud to introduce the Sustainable Multi-Hybrid Transit System for the Twenty-First Century. This project was sponsored by Caltrans District 10 and I am Susan Yan, the project manager.

Figure 8 Morada Middle School Students at Caltarns District 10 Office

BRYANNA TURNER

And I am Bryanna Turner, the budget and marketing manager.

NICHOLAS PIERCE

I'm the transportation engineer.

ABDUL AWNALLAH

Hi. I'm Abdul Awnallah, the electrical engineer.

JUSTIN TOMLINSON

Hi. I'm Justin Tomlinson, the production manager.

FEMALE STUDENT

By now, you may know there's many social, environmental, and economic issues related to transportation—issues such as air quality, global warming, and climate change. Examining the issues early is an important part of finding solutions to those problems. Today, researchers and social scientists are looking at many consequences of our dependence on fossil fuels. Gas is running out and it is non-renewable. We need a greener world with cleaner air. Our transportation system needs to be more efficient so people can go from point A to point B in a safer, faster, and a reliable way. We need a sustainable transportation solution that meets the current transportation need of our society.

MALE STUDENT

The objectives of our project are: first, improve congestion by minimizing the headway distance in between vehicles. Second, this project will increase the flow of traffic, since it will allow many people to be transported as quickly as possible. Third, this project will improve the air quality by reducing emissions, because we will utilize renewable energy sources that are sustainable. Fourth, improve safety on the highways. Safety is our number-one priority. And next, this project will establish better connectivity with existing networks, such as local roads, and mass transit, such as bus routes.

MALE STUDENT

Sustainable energy sources to be used includes as a basis the internal combustion engine, along with solar energy, to charge the batteries for developing electrical energy. Fuel cells will also be utilized.

To maximize the use of sustainable energy, we incorporated the idea of using electromagnetism to link the vehicles together in an effort to minimize the headway distance between vehicles. This will maximize traffic flow. The link between vehicles will be provided through the use of electromagnets that may be turned on or off to allow the vehicles to detach themselves from the line of vehicles and allow the driver to independently reach their destination.

MALE STUDENT

We are proud to present you the Eternity. The Eternity includes various vehicles for various purposes, employing trucks, buses, motorcycles, etc. This is our demo video.

This simple visual demonstration of the project shows a queue of moving vehicles having no physical connection between them and moving independently of each other. The vehicles while in motion are also maintaining a close but constant distance from each other. The constant distance between the vehicles is controlled through the use of electromagnetic forces found in each of the vehicles and also beneath the surface of the roadway.

FEMALE STUDENT

Is this sustainable transportation system feasible? Yes. This system is feasible, yet it will involve the use of various forms of energy, use of current technology, provided we develop a financial plan to obtain grants to fund an experimental program. For marketing purposes, the general public will want an energy-efficient, affordable, reliable, and attractive vehicle. This easily maintainable system will work best in urban areas, although rural areas may be served between major urban centers for commute purposes.

After much consideration, minimizing headway between vehicles would increase traffic flow and safety, paving the success of using electromagnetics as the connecting link for the vehicles.

One issue is to merge vehicles from inner lanes to exit at any desired off-ramp without causing discontinuity of the link system. The sustainable energy sources are possible and may be used as needed to power the vehicles. Are there any questions?

DONNA MAURILLO

We'll hold questions until later on. Is your presentation complete? Thank you very much. That was a very nice concept. Thank you so much.

That was Morada Middle School from Stockton, California. We will move now to Riverside Meadows Intermediate School seventh grade from Plumas Lake, California, and they are broadcasting from the Caltrans District 3 site. Can we go to District 3?

RIVERSIDE MEADOWS INTERMEDIATE SCHOOL SEVENTH GRADE

The Conservation Cruiser

Teacher: Amy DuShane

Presenters: Hannah Shaw and Katiebeth Shively

KATIE SHIVELY

Good morning, everybody! My name is Katie, and this is my partner, Hannah Shaw. We're from Riverside Meadows, and our project is about the Conservation Cruiser. Here we go.

HANNAH SHAW

The first few pictures are about how we think life is, and what it's becoming to the world. These pictures of our animals that are living, and this is the pollution that *is* [today], and that we are creating, and these are animals that are dying from the pollution. These next few pictures are about nature.

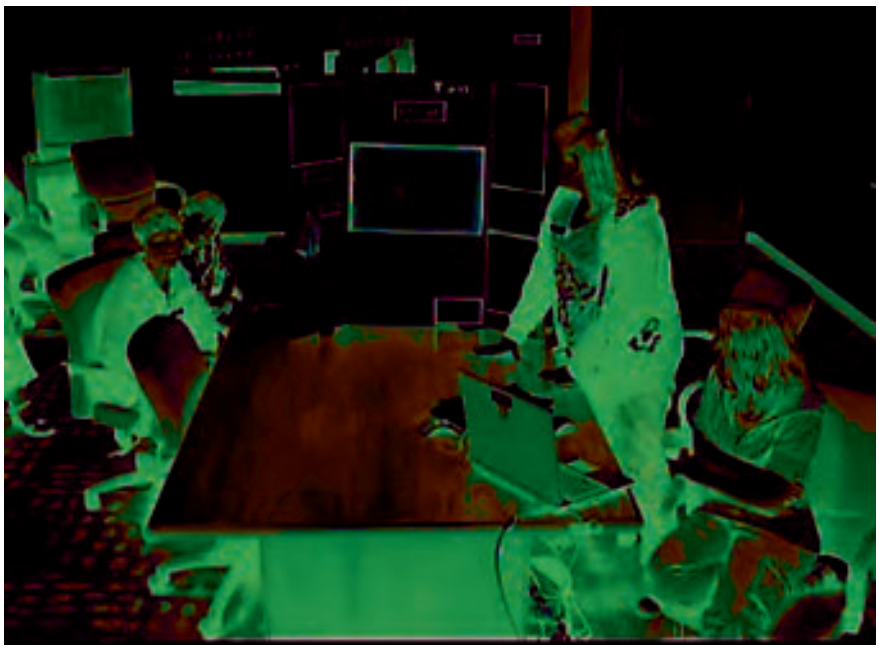


Figure 9 Riverside Meadows Seventh and Eighth Grade Teams in Residence at Caltrans District 3

KATIE SHIVELY

It's so beautiful—nature!

HANNAH SHAW

And this is a picture of how the oil spills and all the pollution is killing the nature and the plants.

KATIE SHIVELY

So me and Hannah Shaw have an idea that we think will revolutionize the way we travel in air.

HANNAH SHAW

It's the Conservation Cruiser.

KATIE SHIVELY

We're hoping that it will let our future generation grow up into a natural and safe environment, but we know safety comes first.

Our concept, our plan, is to make the Conservation Cruiser, an airplane that uses solar power and nitrogen gas for its power. This airplane of our design would rely heavily on

eco-friendly recycling metals and plastic fabric, and other materials in construction, greatly to reduce carbon and footprints.

I'm going to tell about where things are on the airplane. Our solar energy. For our solar energy, we will be using solar panels, which will be on the wings of the upper body of the plane.

This is about wind power. There will be two separate turbines on the side of the plane that will capture wind energy. And this is about liquid nitrogen. The nitrogen will be held in a secure and stable container. The container will be held in the belly of the aircraft.

The solar panels will charge the batteries. The batteries will supply the power and cool motors to drive the turbines. The turbines supply thrust to move the plane. The two separate turbines are made typically for wind energy. They capture wind and turn it into energy. The energy will be used for the light of the plane. The liquid nitrogen is used to cool and super conduct the magnetics within the electrical motors that drive the turbines. These highly effective, efficient electrical motors are extremely eco-friendly; but this energy will not be able to be used until the plane reaches over the cloud banks where there is no interference to the sun's free energy. When the plane takes off, it will be using fossil fuels until they are over the clouds. Then the plane will be able to cruise along with the eco-friendly fuels.

The wind energy? These next few pictures are of the wind energy and nitrogen and solar. These are some of the materials that we'll be using, like solar panels, and LED and CFL lights, and the electro-nitrogen gas tank, the wind energy, the eco-friendly fabrics, which are needed for the seats in the planes and other things. Recycled airplane parts and composite, because we want to limit the metal and weight of airplanes so they can take off easier. Fossil fuels for take-off. Compostable plastics, recycled glass for windows. Eco-friendly appliances. And these are some of the pictures of the things that we'll be using on our plane.

We're having technical difficulties. Sorry about this. And these are the pictures of "green" and how it's all about recycling and about nature. This is the cost—the solar panels are currently selling for between $4 to $6 per watt, so it depends on what your [wattage] is.

A typical plane that you might install a roof would be like between 100 to 30 watts. Therefore, it will cost like $400, around $150 or so. This is how much we'll save. This is the Conservation Cruiser that our next generations will buy. And that's the end, and now we'll be moving over to Hannah Shaw with the board.

HANNAH SHAW

This is a picture of what our plane would look like. As you can see, there are solar panels here, wind turbines here, and parts of decorations, and of eco-friendliness. There are some examples over here of 100 percent cotton, the recycled eco-friendly cups. People who use them are like Starbucks. There's a lot more eco-friendly things, like glass that is eco-friendly for the windows, eco-friendly appliances, like newer appliances are more eco-friendly. Eco-friendly soap. Biocompact bags. There's a ton of eco-friendly things that our

plane will be using.

KATIE SHIVELY

So our whole plane is going to be about being eco-friendly, which means our materials are defined as being recycled, reused, or from natural substances. And that is our plan for the Conservation Cruiser. Thank you.

DONNA MAURILLO

Great! Thanks very much. I think I would like to fly on a plane like that! We're going to move to the same site, the District 3 site, but this time we have a different grade from the same school. This is Riverside Meadows Intermediate School eighth grade from Plumas Lake, California, again, broadcasting from the District 3 site, and we will begin as soon as you get yourselves set up there. Oh, one for the air, one for the water. Cool! You can begin whenever you're ready.

RIVERSIDE MEADOWS INTERMEDIATE SCHOOL EIGHTH GRADE

The Turbo Boat

Teacher: Michelle Dietz

Students: Chris Gottschalk and Cesar Medina

CESAR MEDINA

I am Cesar Medina, and my partner is Chris Gottshalk, and we're going to explain the turbo boat. Our project objective is that we want to create a boat that will reduce consumption of gasoline and oil. We also want to reduce the emissions that boats let out, that go into our atmosphere. We created our idea because we found out that just one large cargo ship can pollute as much as 50 million cars. These boats also emit sulfur soot and other particulate matter. This matter, if inhaled, can be embedded in your lungs, and cause cardiopulmonary illness. Types of cardiopulmonary illness include asthma, emphysema, and bronchitis.

Ships are important, because this is how we trade with other foreign countries and 90 percent of world trade is carried by sea. Ships help us transport cargo over sea, and we also use ships in our Navy that keeps our country safe.

CHRIS GOTTSHALK

Our project works. The turbo boat is going to be powered by hydroelectric energy. Hydroelectric energy is a renewable resource and doesn't pollute. There will be turbines at the bottom of the boat. Then there will be tubes in front and tubes in the back. These tubes are for letting water pass through the boat. When the water passes through the turbines, it will cause them to spin. When the water passes through the turbines, this will

create kinetic energy. Then the turbines will transform the kinetic energy into hydroelectric energy.

The hydroelectric energy is then transferred into the generators. From the generators, the electricity can be used to power the boat. This is how a dam works. This is the concept of what we are using for our idea.

And, from the diagram in the last slide, you can see that, from the generator, the electricity can be transferred by power lines, so the generators' electricity will be transferred to a battery. Then the boat can get the power from that.

Our idea is green because it is less harmful to the environment. Instead of using oil or gasoline, which let out pollution, we are using water to power *our* boat, which is a renewable resource, and is a non-polluting resource. And now Chris is going to explain more about the hydropower.

CESAR MEDINA

So hydropower is the electricity that is generated from the water turbines. Water turbines are commonly in dams. Our ideas can help ships produce less emissions into our environment. Hydropower protects also the (unintelligible) difficult environmental challenges. This issue confronting the hydropower industry includes fish injury and mortality from contact with turbines and other equipment, as well as changes to water quality and physical environment around the project. Our idea is to prevent fish [death] using a metal strainer so that fish don't get into the turbine.

From a drawing, you could see that the water would go into a tube into the turbine, spinning to make energy, and going into the power house, which is above. Here is a blown-up model of a generator and the strainer screens will be placed at the end of each tube. There will also be a second set of strainers near the turbines so nothing gets in the turbines except for water. This will prevent any fish from being injured.

And, from the powerhouse, the electricity can be distributed throughout the boat using power lines. And here's a picture of how a generator would catch energy. And this is a picture of a cargo ship polluting air, which we're trying to solve, and that concludes our presentation. Thanks.

DONNA MAURILLO

Thank you very much. That was a very nice use of hydroelectric power for a boat. Very logical! Thank you very much, Riverside Meadows.

Now, in alphabetical order, and last, but certainly not least, here in District 4, we have Riverview Middle School from Bay Point, California, and you guys can start whenever you're ready. Thank you!

RIVERVIEW MIDDLE SCHOOL EIGHTH GRADE

Travel on the Bay Bridge and in the San Francisco Bay—The Big Idea

Teacher: Rosemary Hatcher

Students: Bianca Magallon, Azjah Mouton, Kyerstin Neely, Alisa Pecot, Angeleke Robinson, Nicolas Romo-Banuelos and Danielle Stinson

UNIDENTIFIED STUDENT

Well, good morning! My name is Devon, and we're going to talk about the Bay Bridge, and what has happened through the process of the earthquake in 1989, the Loma Prieta earthquake, which damaged a section of the east span. Caltrans had decided to tear down the old structure, [and], at the same time, replace it with a self-anchored suspension span. A total of 280,000 vehicles travel across the bridge every day. Caltrans decided to replace the east approach rather than to do a seismic retrofit.

Since the s-curve was put in place, there have been more than 58 accidents. One was fatal. Speed seems to be a major factor in all of the accidents. In conclusion, help make the Bay Bridge safer, to save lives, and enable people, goods, and information to move efficiently.

ALISA PECOT

Hi. I'm Alisa, and our theme is "Travel on the Bay Bridge and in the San Francisco Bay—The Big Idea." Our idea is to improve travel on the San Francisco Oakland Bay Bridge such as traffic and using HOV lanes. All of this came from the Loma Prieta earthquake. Using multiple amphibious vehicles, or MAVs, creates a more efficient way to travel on the Bay Bridge and in the San Francisco Bay. Electricity has been considered an alternate fuel since it is used to charge batteries that power the motors in electric vehicles. The Metropolitan Transportation Commission, or MTC, adopted the Transportation: 2035. We want to modify the plan to accommodate the MAVs.

The San Francisco-Oakland Bay Bridge: brief history.

In 1936, the San Francisco-Oakland Bay Bridge opened after three years and five months of construction. In 1989, a portion of the Bay Bridge collapsed during the Loma Prieta earthquake, measuring 7.1 on the Richter scale. As a result, one person died. In 1996, Caltrans Engineers Consult recommended replacing rather than doing a seismic retrofit. In 2004, the west span was completed. In 2006, the work began on the east span. In 2009, the Bay Bridge opens after closing over the Labor Day weekend to install a new detour connecting the bridge to the Yerba Buena Island. [Shows image] Construction workers on a steel beam. A fatal accident happened on the s-curve. In 2013, the new east span of the Bay Bridge will be completed.

Figure 10 Riverview Middle School Participants

BIANCA MAGALLON

Good morning.

Self-Anchored Suspension, SAS, span. One of the largest contracts in California's history is the SAS span contract. The SAS span is a signature portion of the needed [replacement] span. When this SAS span is complete, it will cleverly be designed to resist any earthquake. This span will have a single cable that will loop over, around a single tower. Thus, the SAS span will be the largest bridge of its kind in the world, which is 2,047 feet.

This SAS span will connect a roadway supported by piers that will slope down towards the Oakland shoreline when completed. Also, when this SAS span is completely finished, the original east span will be torn down. Afterward, a new path will be added on the south side of the Bay Bridge especially made for bicyclists and pedestrians to enjoy the beautiful view of the Bay Bridge.

Figure 11 Riverview Middle School's Bay Bridge Model

AZJAH MOUTON

Good morning. My name is Azjah Mouton. One of the biggest sources that is adding to pollution is gas-powered vehicles. While it is true that cars are cleaner than in the past, the rising numbers of vehicles on the highways and freeways still create pollution. Electricity can be used as an alternative transportation fuel to power batteries in electric vehicles.

Electric vehicles, also known as EVs, store electricity in an energy storage device such as a battery. EVs have a limited energy storage capacity, which has to be replenished by plugging it into an electrical source.

President Obama and Vice President Biden's energy efficient plan states that our dependence on oil is one of the greatest we have ever faced. With gas prices soaring to the skies, switching to electricity would help the economy. President Obama and Vice President Biden ensured that 10 percent of our electricity would come from renewable sources by 2012, and 25 percent by 2025. By switching from gas to electricity, we can eventually save the planet.

NICOLAS ROMO

Good morning. My name is Nicolas Romo.

Multi-Amphibious Vehicles. In 2009, CT&T came up with an advanced vehicle, the multi-

amphibious vehicle. This vehicle is capable to go in land or in water. Many designs have been created for a variety of applications like recreation, expeditions, search and rescue, and military. This vehicle can go up to 55 miles per hour on land and 9.5 miles per hour on water. The vehicle's capacity is four passengers. CT&T made everything in this vehicle waterproof by putting the equipment in containers. There is a special license needed to drive this vehicle. The license cost at the moment is still pending. This vehicle is not yet permitted in highways due to the speed. This vehicle is pollution-free.

Figure 12 Riverview Middle School Team with MTI's Executive Director Rod Diridon and Caltrans District 4 Director Bijan Sartipi

KYERSTIN NEELY

Good morning. "How MAV Works." When in water, two fans control the MAV. The machine is powered by electric motors when on the road and the same motor powers the propeller when in water. CT&T has announced that this vehicle is great for golfers because it is able to go on water. Many golf companies have bought this vehicle and rent them for $35 an hour. Travel to the Bay Bridge and (unintelligible), and AVs that travel in the Bay will have their own HOV lanes. New on- and off-ramps would have to be added to the bridge to accommodate the vehicle. AVs at designated areas will be able to exit and enter the water and the bridge. Commercial MAVs would help reduce traffic congestion a great deal. Just imagine! When traffic is backed up during commute hours, you could drive your vehicle in the Bay. You will have the ability to enter and exit the Bay at one of several designated areas: in San Francisco, on the Embarcadero; and, in Oakland, at the Port of Oakland, or at Jack London Square. When traveling in your MAV, family outings or recreational events

would be more exciting and relaxing.

ANGELEKE ROBINSON

Hi. My name is Angeleke Robinson. “The United States Coast Guard Vessel Traffic Training.” There are several problems for drivers like water conditions around the Bay and Golden Gate Bridge. Before anyone drives an MAV, drivers will have to take training from the Department of Boating and Waterways. The San Francisco Bay is the fifth-largest port in the nation. To lessen the risk of groundings and collisions, the [USCG] Traffic Service will separate traffic lanes for crossing in an area and seven regulated navigation areas to coordinate the flow of traffic into and out within the central portion of the Bay. CG [Coast Guard] of San Francisco is responsible for the safety of at least 133 miles of waterways from offshore to the port of Stockton and Sacramento.

Yes, we *can* change transportation. Amphibious vehicles will have to be coming. On April 22, 2009, the MTC adopted the [Transportation] 2035 Plan for the San Francisco Bay area. Amphibious vehicles will have to be incorporated into the MTC. It’s detailed as how some of $218 billion is anticipated. Federal, state, and local trans funds will be spent in the nine-county Bay Area during the next 25 years. MTC worked very closely over many months with thousands of Bay Area residents, as well as the businesses, communities, and environmental groups. County congestion management agencies, the Association of Bay Area Governments, the Bay Area Air Quality Management, the Bay Conservation and Development Commission will and most likely have to investigate how to regulate this new, highly improved mode of transportation.

It will make sustainable transportation a reality in the twenty-first century. Sustainable transport systems make a positive contribution to the environmental, social, and economic sustainability of the communities they serve. The actual purpose of transport is access to work, education, goods and services, friends and family, and there are proven techniques to improve access while, at the same time, we do things with environmental and social impact and managing traffic congestion.

DANIELLE STINSON

This is our site at work, and thank you for watching our presentation.

DONNA MAURILLO

Great. Thank you very much. That was very interesting. I hadn’t thought of crossing the Bay that way, but it sounds like it could be fun.

We will start with a question-and-answer period, but instead of doing a free-for-all, like we did last year, and some people were cut off, we’re going to be fair to everybody this year. We’ve taken suggestions from the teachers and the sponsors to figure out how we could do it in a more organized way this time. So what I’m going to do is call on each school again, in alphabetical order, and you will be able to ask a question of another school about

their project. And we will go through in alphabetical order, all the way through, and you'll be able to ask and answer. Are you ready? We will go first to Kemps Landing Magnet School at the Vicom site. Go ahead. Do you have a question there?

QUESTIONS AND ANSWERS

KEMPS LANDING

Yeah, for the Riverside eighth-grade group, we would like to know about how your energy works, as it seems as if you're creating energy, kind of, like you're moving forward.

We'd like to know how your boats get started in the first place, because we know that, once they get going, there's water being pushed through the turbines. However, when they're standing still, there's no water being pushed through. So how did you get them started in the first place?

RIVERSIDE (EIGHTH GRADE)

We still use a little bit of gas, but only to start it.

So then, after it starts, then the generators kick in, and then start creating the energy.

KEMPS LANDING

All right. And can we ask a follow-up question on that one?

DONNA MAURILLO

Yes, go ahead. You can ask a follow-up question. It's considered one question.

KEMPS LANDING

How does the use of fossil fuels, and the non-use of fossil fuel, once it gets going, affect the overall cost and the economic benefits of your turbo boat?

RIVERSIDE (EIGHTH GRADE)

Yeah. It's still cost-effective, just because you don't have to spend so much money on gas.

KEMPS LANDING (ALL)

Thank you. Thank you very much.

DONNA MAURILLO

We'll move on now to Morada Middle School from Stockton, California. Morada, do you have a question for any of the other schools?

MORADA MIDDLE SCHOOL

Yeah. We have a question for Riverside. We have a few questions. Our first question is—The one about the Bay Bridge...

DONNA MAURILLO

That's Riverview.

MORADA MIDDLE SCHOOL STUDENT BRYANNA TURNER

How are you going to improve the travel on the bridge? I don't know how to explain it.

MORADA MIDDLE SCHOOL (MALE STUDENT)

Let me take over for Bryanna. I think she wonders how, if there's a stream of little boats going next to the Bay Bridge, what if, say, a cargo ship wants to go under, and out into the sea? How is it going to be able to do that with a rush hour of little boats just passing next to the boat?

RIVERVIEW (FEMALE STUDENT)

Well, it depends on how you say it. There's gonna be different lanes for the buses and the ships to go in, so it depends, like they're not gonna cross each other. There's not going to be anything like that, but there's gonna be different lanes for it to go under the bridge, and stuff like that.

RIVERVIEW (MALE STUDENT)

We'll be going perpendicular to the stream of boats, 'cause they're not gonna go sideways across the Bay. They're gonna probably just go straight ahead, right along next to the bridge.

RIVERVIEW (FEMALE STUDENT)

The ships that are going perpendicular to the MAVs? Well, the MAVs will have to stop when they're passing by.

DONNA MAURILLO

Redland Middle School from Rockville, Maryland, do you have a question for one of the other schools?

MORADA MIDDLE SCHOOL

Morada doesn't have a second question? You let one ask a second question.

DONNA MAURILLO

They're one at a time, and then I go through again. Redland Middle School, do you have a question for one of the other schools?

REDLAND MIDDLE SCHOOL

Kemps Landing Magnet School. How many passengers can the IHBS accommodate?

KEMPS LANDING (FEMALE STUDENT)

Well, our shuttle buses, they have room for 22 [seated] people, and another room for 10 more to stand, so they have a capacity of 32—people per bus.

KEMPS LANDING (MALE STUDENT)

Well, on the larger buses, they're basically 60-foot-long buses, and so they are roomy to accommodate all the commuters who will be using the bus system.

KEMPS LANDING (FEMALE STUDENT)

There are many buses within the neighborhoods which will accommodate all the people in that neighborhood, and then there's also larger buses which go between the central locations, which will accommodate even more people.

DONNA MAURILLO

Riverside Meadows seventh grade, do you have a question for another school?

RIVERSIDE MEADOWS SEVENTH GRADE (FEMALE STUDENT)

Yes, we do.

We have a question for Riverview Middle School. How will aquatic life be affected by the AV?

RIVERVIEW

It wouldn't be affected.

RIVERSIDE MEADOWS SEVENTH GRADE (FEMALE STUDENT)

But like how? Well, how is that possible if you have cars and stuff traveling on the water?

RIVERSIDE MEADOWS SEVENTH GRADE (MALE STUDENT)

The cars are using electricity, so [they're] not making a pollutant in the water whatsoever.

DONNA MAURILLO

Riverside Meadows eighth grade, do you have a question for another school?

RIVERSIDE MEADOWS EIGHTH GRADE (MALE STUDENT)

Yeah, we do.

DONNA MAURILLO

Go ahead. Which school?

RIVERSIDE MEADOWS EIGHTH GRADE (MALE STUDENT)

For Riverview Middle School, the same school. How much will the amphibious vehicle cost?

RIVERVIEW (MALE STUDENT)

From $35,000 to $55,000.

RIVERVIEW (MALE STUDENT)

For addition to the main cost.

RIVERVIEW (MALE STUDENT)

For the normal ones.

RIVERSIDE MEADOWS EIGHTH GRADE (MALE STUDENT)

All right. Thanks.

DONNA MAURILLO

Riverview Middle School, do you have a question for another school?

RIVERVIEW (MALE STUDENT)

Yes, for Kemps Landing Middle School.

RIVERVIEW (MALE STUDENT)

For the hybrid bus system, how long are these buses going to be able to run before they have to recharge again?

KEMPS LANDING (FEMALE STUDENT)

Well, they never have to recharge again, because they don't run on electricity, but we're replacing the buses every 15 years.

KEMPS LANDING (MALE STUDENT)

The internal combustion engine is actually powered by the electric motor, because the electric motor gets the (unintelligible). The internal combustion engine makes the energy, which goes to the electric generator, which converts it to electricity, which actually spins the wheels. And so the energy is being made, while the car is running, by an internal combustion engine, which is powered by the gas, and so the gas is used to make the electricity. There are no batteries.

DONNA MAURILLO

Kemps Landing, we'll start again at the top of the list again. Kemps Landing, do you have a question for another school?

KEMPS LANDING (FEMALE STUDENT)

Yes.

DONNA MAURILLO

For who?

KEMPS LANDING (FEMALE STUDENT)

We have a question for the school that had the plan for the Bay Bridge, okay?

Well, we were wondering how you were going to encourage people to invest in an amphibious vehicle when already money is tight for many families, and this amphibious vehicle will only assist them on rare occasions like a bay.

RIVERVIEW MIDDLE SCHOOL (MALE STUDENT)

They could drive it.

RIVERVIEW MIDDLE SCHOOL (MALE STUDENT)

They could drive it on land and water, so it will be a—more like a—multi-use thing, so they can go kind of far, but they just can't be on the freeway.

KEMPS LANDING (FEMALE STUDENT)

But if they can't go on the freeway, and there's already a bridge for cars, why would they

buy an amphibious car over a regular car that can go up to like 70 miles an hour? Why would they buy the amphibious car? It obviously would be more expensive, wouldn't it?

RIVERVIEW MIDDLE SCHOOL (MALE STUDENT)

No, it would be cheaper, because there's no paying for gas, and there's no carbon emissions.

KEMPS LANDING (FEMALE STUDENT)

How do you plan on powering the thing without—

DONNA MAURILLO

Only one question per school, and a follow-up.

KEMPS LANDING (FEMALE STUDENT)

All right.

DONNA MAURILLO

So we'll move on to Morada Middle School. Do you have a question for another school?

MORADA MIDDLE SCHOOL (FEMALE STUDENT)

I have a question for Redland Middle School.

Is there any natural gases or fossil fuels that you want to create in your car?
Did you understand my question?

DONNA MAURILLO

Redland Middle School, are you still on with us? Is the connection still there?

Can somebody here at Caltrans check that connection?

Do you have a question for another school?

MORADA MIDDLE SCHOOL (MALE STUDENT)

Yeah...

DONNA MAURILLO

They're back on again. Go ahead, Redland.

Who had the question for Redland? Did Morada have the question for Redland?

MORADA MIDDLE SCHOOL (ALL)

Yes.

DONNA MAURILLO

Go ahead and ask your question. They're on again.

MORADA MIDDLE SCHOOL (FEMALE STUDENT)

Is there any natural gases or fossil fuels in your vehicle?

REDLAND MIDDLE SCHOOL (FEMALE STUDENT)

No. It's a high-speed rail train.

MORADA MIDDLE SCHOOL (FEMALE STUDENT)

Okay.

DONNA MAURILLO

Redland Middle School, do you have a question for another school?

REDLAND MIDDLE SCHOOL (FEMALE STUDENT)

No.

DONNA MAURILLO

Bill Millar, please be sure that, when the secretary arrives that you let us know, because we'll stop the questions and answers at that time.

Thanks. Riverside Meadows seventh grade, do you have a question for another school?

RIVERSIDE MEADOWS SEVENTH GRADE

Yes, we do. For Riverview Middle School.

We have a question. We know that your aquatic transportation isn't [living] in the water, but with all those boats, and all those people in the water, how will it affect the migration of animals? How will it affect the all the animals in the water… with the eggs and things?

RIVERSIDE MEADOWS SEVENTH GRADE (MALE STUDENT)

Like whales and fish, that— and migrating whales.

RIVERSIDE MEADOWS SEVENTH GRADE (FEMALE STUDENT)

And how people will like, fish?

RIVERVIEW MIDDLE SCHOOL (MALE STUDENT)

It won't affect it at all because it will be just like a normal boat. It will be on the surface. It won't be any close to the animals.

RIVERSIDE MEADOWS SEVENTH GRADE (FEMALE STUDENT)

But how? You guys have more of them now. We have more people in the water.

RIVERVIEW MIDDLE SCHOOL (MALE STUDENT)

Wait. Can you repeat the question? Like can you rephrase it?

RIVERSIDE MEADOWS SEVENTH GRADE (FEMALE STUDENT)

Yeah, one, a couple of boats in the water won't affect it; but how would a lot of them like affect it?

RIVERVIEW MIDDLE SCHOOL (FEMALE STUDENT)

The MTC will accommodate the vehicles.

RIVERSIDE MEADOWS SEVENTH GRADE (FEMALE STUDENT)

I'm not worried about the vehicles; I'm worried about the animals.

RIVERVIEW MIDDLE SCHOOL (FEMALE STUDENT)

The MTC plan is… they're working to accommodate it, to have certain areas where they know not much wildlife go through, to be able to have the amphibious vehicles on the water to not destruct the environment or animals.

RIVERVIEW MIDDLE SCHOOL SEVENTH GRADE (MALE STUDENT)

And the amphibious vehicles will only be in the water at certain times.

RIVERSIDE MEADOWS SEVENTH GRADE (FEMALE STUDENT)

Okay. Thank you.

DONNA MAURILLO

Riverside Meadows eighth grade, do you have a question?

RIVERSIDE MEADOWS EIGHTH GRADE (MALE STUDENT)

Yeah, we do.

DONNA MAURILLO

For which school?

RIVERSIDE MEADOWS EIGHTH GRADE (MALE STUDENT)

Kemps Landing.

RIVERSIDE MEADOWS EIGHTH GRADE (MALE STUDENT)

How exactly does your bus start? Does it use gas to start?

KEMPS LANDING (MALE STUDENT)

The internal combustion engine turns the bus on, and then, after it's on, it starts to create electricity, which actually [turns] the wheels. And so the internal-combustion engine is just used to turn it on. After that, it's all electric.

RIVERSIDE MEADOWS EIGHTH GRADE (MALE STUDENT)

So it does have gas?

KEMPS LANDING (MALE STUDENT)

It's a hybrid.

KEMPS LANDING (MALE STUDENT)

It uses gas; however, it has 30 percent more fuel efficiency than a conventional bus, and it saves 50,000 gallons of diesel fuel per bus over 30 years; and so, while some ultra-low-sulphur diesel fuel is used, it is greatly reduced from the diesel used by a conventional bus.

DONNA MAURILLO

Riverview Middle School, do you have a question for another school?

RIVERVIEW MIDDLE SCHOOL (MALE STUDENT)

Yes. We have a question for Riverside Meadows seventh grade.

RIVERVIEW MIDDLE SCHOOL (MALE STUDENT)

How many passengers will be able to ride on the plane?

RIVERSIDE MEADOWS SEVENTH GRADE (FEMALE STUDENT)

Forty to 50, because we still want to get profit.

RIVERSIDE MEADOWS SEVENTH GRADE (FEMALE STUDENT)

It will probably accommodate, or it will accommodate, the same as a “normal” plane would. It would just be more fuel-friendly.

RIVERVIEW MIDDLE SCHOOL (FEMALE STUDENT)

What size?

RIVERSIDE MEADOWS SEVENTH GRADE (FEMALE STUDENT)

Like a normal aircraft. A normal passenger plane.

UNIDENTIFIED MALE STUDENT

There’s a Boeing 747. There’s a lot of different…

DONNA MAURILLO

Kemps Landing, do you have a question for another school?

KEMPS LANDING (MALE STUDENT)

Yes.

This is for the Riverside seventh graders.

KEMPS LANDING (FEMALE STUDENT)

With all of the eco-friendly items you propose to put on the plane, which already cost a lot of money individually, what is gonna be the price you propose for manufacturing such a plane?

RIVERSIDE MEADOWS SEVENTH GRADE (MALE STUDENT)

They'll cost less, 'cause they're recycled materials.

RIVERSIDE MEADOWS SEVENTH GRADE (FEMALE STUDENT)

There will be recycled materials, but I still say, for our airplane, so it, because of that, it probably won't cost as much, but it will still cost (someone is whispering) probably (talkover).

KEMPS LANDING (MALE STUDENT)

Could we have a follow-up question, please?

DONNA MAURILLO

If it's related to the first one, yes.

KEMPS LANDING (MALE STUDENT)

You stated that, since the plane is made of recycled materials, it will be cheaper. However, typically, in everyday, we see that recyclable materials tend to be more expensive, since they require processing of those materials. Can you refute that fact?

RIVERSIDE SEVENTH GRADE (FEMALE STUDENT)

Manufacturing costs more, though.

KEMPS LANDING (ALL)

Okay. Thanks.

DONNA MAURILLO

Let's see. That was Kemps Landing asking that question? We'll go to Morada Middle School. Do you have a question for another school?

MORADA MIDDLE SCHOOL (FEMALE STUDENT)

Yeah. For Riverview, about the Bay Bridge.

MORADA MIDDLE SCHOOL (FEMALE STUDENT)

How long do you estimate the Bay Bridge will (unintelligible) after your idea?

RIVERVIEW MIDDLE SCHOOL (MALE STUDENT)

Repeat the question.

MORADA MIDDLE SCHOOL (GROUP OF STUDENTS)

Yeah. How long will it last?

RIVERVIEW MIDDLE SCHOOL (MALE STUDENT)

Well, it depends on the people that's doing the maintenance.

RIVERVIEW MIDDLE SCHOOL (FEMALE STUDENT)

It depends on the people that's doing the maintenance, how well…

MORADA MIDDLE SCHOOL (FEMALE STUDENT)

Then how will we estimate that?

RIVERVIEW MIDDLE SCHOOL (MALE STUDENT)

It's not our job. It should last a hundred years.

RIVERVIEW MIDDLE SCHOOL (MALE STUDENT)

It should last about as long as a regular car. With good use.

MORADA MIDDLE SCHOOL (FEMALE STUDENT)

Thank you.

DONNA MAURILLO

Redland Middle School, do you have a question for another school?

REDLAND MIDDLE SCHOOL (FEMALE STUDENT)

No.

DONNA MAURILLO

Riverside Meadows seventh grade, your question?

RIVERSIDE MEADOWS SEVENTH GRADE (FEMALE STUDENT)

Yes, we do.

DONNA MAURILLO

Go ahead. For which school?

RIVERSIDE MEADOWS SEVENTH GRADE (FEMALE STUDENT)

Riverview Middle School.

DONNA MAURILLO

Okay, Riverview. You guys are getting hit here! That's good. Go ahead.

RIVERSIDE MEADOWS SEVENTH GRADE (FEMALE STUDENT)

You said that your vehicle will be powered by electricity, but how do the electricity and the water mix? Because electricity and water do not go together at all.

RIVERVIEW (MALE STUDENT)

Everything in this vehicle is waterproof. The company that made the vehicle put everything that they use in containers, and that's how they made it waterproof.

DONNA MAURILLO

Riverside Meadows eighth grade, do you have a question for another school?

RIVERSIDE MEADOWS EIGHTH GRADE (MALE STUDENT)

Yeah, for Kemps Landing. Would this bus influence more people to ride the bus? Or will the same number of people ride them?

KEMPS LANDING (FEMALE STUDENT)

Well, this bus will actually prove to be more convenient, because it would go into individual neighborhoods, and therefore, more people will use vehicle, and it would more accessible for people.

KEMPS LANDING (MALE STUDENT)

Also, the current system charges a fare of $1.50 one way; however, with the [IHBS], it would be an $0.80 fare for a day pass, so you can ride as many times as you would like, and more people would be inclined to ride it when it's cheaper.

KEMPS LANDING (FEMALE STUDENT)

Also, it goes to more areas of the city such as the ocean front and the main shopping centers, and the Naval base. It was going to let people visit every single day, and, because

of the low fares, there's no reason for the shoppers won't go to the same places at a lower price.

KEMPS LANDING (FEMALE STUDENT)

Right. That's exactly why we chose seven main centralized locations of the city.

RIVERSIDE MEADOWS EIGHTH GRADE (MALE STUDENT)

All right. Thanks.

DONNA MAURILLO

Riverview Middle School, do you have a question for another school?

RIVERVIEW (MALE STUDENT)

Oh, yes. This is for Kemps Landing. Okay. I was wondering, if you were gonna use a combustion engine to run your electric motor, wouldn't it just be like using a regular combustion engine if the combustion engine will be running the whole day, charging the electric motor?

KEMPS LANDING (MALE STUDENT)

It's cheaper to have the, or it's more efficient, to have the internal-combustion engine create the electricity which runs the wheels than to have the combustion engine turn the wheels itself, and it saves fuel in the conversion process.

DONNA MAURILLO

Kemps Landing, do you have a question for another school?

KEMPS LANDING (FEMALE STUDENT)

Yes, we do.

DONNA MAURILLO

For which school?

KEMPS LANDING (FEMALE STUDENT)

This is for Morada Middle School. What we are wondering is what problems are like malfunctions can occur with the electromagnetism? And if there's any type of problems with automobile accidents, or any type of like stand to quickly solve in this type of situation?

KEMPS LANDING (FEMALE STUDENT)

Like if a car breaks down, what happens to the car behind it?

MORADA MIDDLE SCHOOL (FEMALE STUDENT)

Well, the vehicles can easily detach from the link system, so if a problem does occur, you can actually detach it and move onto another lane, and attach to another vehicle.

KEMPS LANDING (FEMALE STUDENT)

So, like, for follow-up, is there any type of set plan that's used in this type of situation if something were to break down and have to, like, detach from the other car in front of it?

MORADA MIDDLE SCHOOL (FEMALE STUDENT)

Yes.

KEMPS LANDING (FEMALE STUDENT)

Thank you.

DONNA MAURILLO

Morada, do you have a question for another school?

MORADA MIDDLE SCHOOL (FEMALE STUDENT)

Yeah, I have a question for Riverside Meadows.

DONNA MAURILLO

Riverside Meadows seventh or eighth grade? Is it the boat or the plane?

MORADA MIDDLE SCHOOL (FEMALE STUDENT)

The plane.

DONNA MAURILLO

That's seventh grade.

MORADA MIDDLE SCHOOL

How can you guarantee that your Conservation Cruiser will help the environment?

RIVERSIDE MEADOWS SEVENTH GRADE (FEMALE STUDENT)

Well, since our plane uses recycled materials, wind power, and solar power, it is not using very much fossil fuels, or anything like that, to harm the environment, so that's basically—

RIVERSIDE MEADOWS SEVENTH GRADE (FEMALE STUDENT)

It's like a hybrid car, but an airplane.

DONNA MAURILLO

Thank you. Redland Middle School from Rockville, Maryland, do you have a question?

REDLAND MIDDLE SCHOOL (FEMALE STUDENT)

Yes.

DONNA MAURILLO

Good. For which school?

REDLAND MIDDLE SCHOOL (FEMALE STUDENT)

Kemps Landing.

REDLAND MIDDLE SCHOOL (FEMALE STUDENT)

Oh, Riverside. I'm sorry. How can you use solar [panel] with our sun in case of snow days?

RIVERSIDE MEADOWS SEVENTH GRADE (FEMALE STUDENT)

Well, when you get over—

REDLAND MIDDLE SCHOOL (FEMALE STUDENT)

The question is for Riverside.

DONNA MAURILLO

Is that for Riverside Intermediate? That's for the plane, I would imagine? With its panels?

REDLAND MIDDLE SCHOOL (FEMALE STUDENT)

Yes.

DONNA MAURILLO

Great. Riverside seventh grade, go ahead.

RIVERSIDE MIDDLE SCHOOL SEVENTH GRADE (FEMALE STUDENT)

Well, once we are over the cloud banks, there will be less interference with the clouds and the sun, so the sun will hit the solar panels. And even then, we still have the wind energy.

DONNA MAURILLO

Thank you very much. Morada Middle School, do you have a question for another school?

MORADA MIDDLE SCHOOL (MALE STUDENT)

Yes. We have a question for Riverside. Do you think your project—

DONNA MAURILLO

Riverside seventh or eighth grade?

MORADA MIDDLE SCHOOL (MALE STUDENT)

About the boat.

DONNA MAURILLO

About the boat. That's eighth grade, yes.

MORADA MIDDLE SCHOOL (MALE STUDENT)

Do you think your project will be sustainable enough?

RIVERSIDE MIDDLE SCHOOL EIGHTH GRADE (MALE STUDENT)

Yes, because it will be running on the water, using the electric energy from the turbines, instead of using all the gasoline that it takes to power the boat.

MORADA MIDDLE SCHOOL (MALE STUDENT)

Oh, okay. Thank you.

DONNA MAURILLO

Redland, do you have a question for another school?

REDLAND MIDDLE SCHOOL (FEMALE STUDENT)

No.

DONNA MAURILLO

Riverside Meadows Seventh, do you have a question for another school?

RIVERSIDE MEADOWS SEVENTH GRADE (FEMALE STUDENT)

Yes, we do.

DONNA MAURILLO

For which school?

RIVERSIDE MEADOWS SEVENTH GRADE (FEMALE STUDENT)

Riverview Middle School.

RIVERSIDE MEADOWS SEVENTH GRADE (FEMALE STUDENT)

You said that the car would be powered by electricity, and we were wondering where would the electricity be received from, and how much would the container that holds the electricity cost?

RIVERVIEW MIDDLE SCHOOL (MALE STUDENT)

Well, it's making the battery, so—

RIVERVIEW MIDDLE SCHOOL (MALE STUDENT)

In gas stations, they're creating sections off to the side where electric vehicles can plug in, into the storage capacity, and it would be charged for 24 hours.

DONNA MAURILLO

Riverside Meadows eighth grade, do you have a question?

RIVERSIDE MEADOWS SEVENTH GRADE (MALE STUDENT)

Yes.

DONNA MAURILLO

For which school?

RIVERSIDE MEADOWS SEVENTH GRADE (MALE STUDENT)

We have a question for Kemps Landing. If a bus is damaged or in an accident, what would replace the bus? Or would a whole schedule of the buses be thrown off?

KEMPS LANDING (FEMALE STUDENT)

In our shuttle buses, we have provided extra buses, because there are 35 routes, but we are purchasing 40 buses, so four shuttle buses are extra. Additionally, on the larger routes between the central locations, again, multiple buses going through the same routes. So we will be able to reschedule, and have more buses coming in (unintelligible).

DONNA MAURILLO

Riverview Middle School, do you have a question for another school?

RIVERVIEW MIDDLE SCHOOL (FEMALE STUDENT)

Yes. I have a question for Riverside seventh grade. Do you have a safety plan in case of an emergency?

RIVERSIDE MEADOWS SEVENTH GRADE (FEMALE STUDENT)

Yes. In case of emergency, we will use one of the other—like what kind of emergency, though? Like an accident, or—

RIVERSIDE MEADOWS SEVENTH GRADE (FEMALE STUDENT)

… powered down.

RIVERVIEW MIDDLE SCHOOL (MALE STUDENT)

What if the engines die?

RIVERSIDE MEADOWS SEVENTH GRADE (FEMALE STUDENT)

Well, we will use one of our other energy sources, like the wind or the solar, to back up the battery, and we still have the fossil fuels just in case.

RIVERVIEW MIDDLE SCHOOL (FEMALE STUDENT)

May we have a follow-up?

DONNA MAURILLO

If it's related to your question, yes.

RIVERVIEW MIDDLE SCHOOL (FEMALE STUDENT)

But what's gonna power the rest of the plane?

RIVERSIDE MEADOWS SEVENTH GRADE (FEMALE STUDENT)

Power the plane?

RIVERSIDE MEADOWS SEVENTH GRADE (FEMALE STUDENT)

Don't all planes crash and have failures?

ALL STUDENTS

Yes.

RIVERSIDE MEADOWS SEVENTH GRADE (FEMALE STUDENT)

So I'm kind of confused on your question.

DONNA MAURILLO

I'm going to just check in with Bill Millar again right now. Bill, has the secretary arrived yet?

BILL MILLAR

No, our guests are not here yet.

DONNA MAURILLO

No? Has Secretary Mineta arrived yet?

Then I'll start again at the top of the list with more questions. And then, as soon as the secretaries arrive, we'll break for that. Kemps Landing, do you have a question for another school? Kemps Landing, are you still with us?

Did Vicom drop? Vicom may have dropped off. If Caltrans can check on that connection, that would be great. I'll just move on to the next school. Morada Middle School, do you have a question for another school?

MORADA MIDDLE SCHOOL (MALE STUDENT)

Yes, we have a question for Riverside seventh grade. How much do you think the cost will be for the plane? What's your estimate? Wait. They're not going to the (unintelligible, laughter) It is? Okay. How much do you—how much is the estimated cost on the plane?

RIVERSIDE MEADOWS SEVENTH GRADE (FEMALE STUDENT)

That has been already asked, so—

MORADA MIDDLE SCHOOL (MALE STUDENT)

I didn't hear you. What is it?

MORADA MIDDLE SCHOOL (MALE STUDENT)

I'll take over for Abdul here, okay? I have a question for Redland.

MORADA MIDDLE SCHOOL

How is your high-speed rail going to stop terrorism?

REDLAND (FEMALE STUDENT)

Well, it doesn't really use a lot of foreign oil. You don't really need foreign oil for it, and if we did have to use foreign oil, then that would increase the risk, but we don't really need foreign oil for high-speed rail.

MORADA MIDDLE SCHOOL (MALE STUDENT)

That wasn't my question. My question was, how does your high-speed rail plan to stop terrorism?

REDLAND (FEMALE STUDENT)

Because it's in the U.S. and it's not international.

MORADA MIDDLE SCHOOL (MALE STUDENT)

Okay.

GUEST SPEAKERS: NORMAN Y. MINETA AND RAY LA HOOD

BILL MILLAR

Donna, this is Bill Millar. Our special guests have arrived. Do you want to have me introduce them now, or do you want to do more questions?

DONNA MAURILLO

Yes, please, if you would do that. Thank you very much. And thank you to the schools for all your very intelligent and often very challenging questions and answers. So I think you all deserve a huge round of applause and I'm sure both secretaries are very proud of the work that you all have done today. Thank you very much. Okay, Bill, take over, please.

BILL MILLAR

Thank you, Donna, and let me add my thanks to everyone involved, and to all the students. You are certainly asking the right kind of questions, and so I think this has been very helpful indeed, and I know we at the American Public Transportation Association appreciated all the presentations and all the work that went into [them].

I said at the beginning of the symposium that we had two very special guests to join us, and it's my privilege to introduce to you Secretary Norman Mineta. If that name sounds familiar to you, he's the founder of the Mineta Transportation Institute, which is the sponsor of today's seminar, but Secretary Mineta has a very long and very distinguished public service career.

He's been the mayor of San José, California. He's been a member of the United States Congress for many years, including [serving] as the chairman of one of the most important committees, the Public Works and Transportation Committee, in that department. He served as the U.S. Secretary of Commerce [during the Clinton administration]. He has served in a number of private-sector opportunities with some of America's most famous companies; but, most recently, in his public service, he was the U.S. Secretary of Transportation [during the George W. Bush administration].

Now, students, I know most of you are 12, 13, 14 years of age, and when you were young people, there was a terrible terrorist attack in America that I'm sure you've heard about, now known as 9/11. Well, Norman Mineta was the Secretary of Transportation at that time, and he was one of the key government officials that was trying to first figure out exactly what had happened, and then make the very difficult decisions as to how to make all Americans safe. So it is with very great honor that I introduce the Honorable Norman Y. Mineta.

NORMAN MINETA

Thank you very much, Bill, for your very kind and generous introduction. To all of the students across the country, including the students with whom [I] have pleasure of being [with] here in DC, I want to welcome all of you to the Garrett Morgan Symposium, again, a series that we have every year, the competition across the country, and it always just thrills me to see the kind of innovative projects that all of you do, year-in and year-out, and I want to thank the teachers and the sponsors and the supervisors who are involved in this program.

Figure 13 The Honorable Norman Y. Mineta

Today I have the great privilege of introducing someone who is very important in President Obama's cabinet, and his name is Ray LaHood. I've known Ray for a very long time. He was a staff member to a member of Congress by the name of Tom Railsback from Illinois. And then, when Tom retired, this gentleman became the chief of staff to the then Republican leader in the U. S. House of Representatives, Bob Michel. And then, when Bob Michael retired, Ray then ran for that Congressional seat, and won it, and when he came into Congress as a member of Congress, he then came on the House Committee on Public Works and Transportation, which I was chairing at the time.

So he not only has a background of being a staff person, but now he was a member of Congress himself. He distinguished himself as a member of Congress, and was appointed a member of President Obama's cabinet; I was the only Democrat in President Bush's cabinet, and Ray LaHood is a Republican in President Obama's cabinet. But because of his own background in terms of the kind of person he is, President Obama picked him as the secretary of transportation, and he's been doing a terrific job as a member of the president's cabinet. I've known Ray for a long time, and I consider him a very good, close,

personal friend, as well. And so it is my great pleasure to introduce to all of you across the country my good friend, Ray LaHood, the secretary of transportation for President Obama. Ray?

RAY LAHOOD

Thank you very much. Welcome to those of you who haven't been welcomed. We're delighted that we have some students here at the Department of Transportation, and we know that many of you are watching us from around the country. This is such an extraordinary program, and I want to thank Secretary Mineta for his leadership in making sure that this kind of program offers opportunities to young people to be thinking about transportation, and to be thinking about careers in transportation, and to be thinking about the opportunities that are really created through transportation.

Transportation is so important. I know you've all been studying that, and you've been learning a lot about it—trains, planes, automobiles, and all other forms of transportation. We deal with these kinds of issues here at the department, and our department is made up of 55,000 employees, so they're all transportation workers. Some work with the airlines. Some work with the automobile industry. Some work with the railroad industry. Some work with other forms of transportation. And the reason I mention that is because there are tremendous opportunities for those who want to get involved in transportation careers and transportation opportunities.

One of the things that we've been doing since we've been in this job for the last 13 months is carrying out President Obama's agenda, part of which is to get our country into the passenger rail business. For those of us who live here in Washington, we know we have good rail transportation to New York. But if you go to other places in the country, they don't have that good of a rail transportation system, so it's not as easy for people to get on a train and go where they want to go. And so that's one of our real priorities, making sure that, over a period of the next decade or so, we really help America get into the high-speed rail business, and that's one of the president's very strong agenda items.

Safety is also another big part of our agenda, making sure that when people get in a car, or on a bus, or on a train, on an airplane, that it's the safest form of transportation. For the people who fly them or drive them, that they're well-trained. They're well-rested. And for people who get in their cars, to make sure they know what they're doing, make sure they have the right driver's license. For people who drive big trucks, to make sure they know that they have to have the proper training. So we deal in all forms of safety. It's a big priority. We want to make sure that people know the roads are safe, the airways are safe, the trains are safe, and that people can say that they are the safest that they can possibly be.

So, with that, I'll be happy to, as I did last year, answer some questions for those of you that may have a question about either the work that we're doing or about transportation. I know

that you've learned a lot from just the studies that you've been doing about transportation, and if there's some way that we can be helpful by answering your questions, I'll be happy to do that. So who would like to start?

Figure 14 Secretary of Transportation Ray LaHood

ROD DIRIDON

Mr. Secretary? This is Rod Diridon from the location in California.

RAY LAHOOD

Hi, Rod. Thank you for your leadership.

ROD DIRIDON

And I'm happy to be the executive director of the Mineta Transportation Institute, and we're very proud to have you and Secretary Mineta here.

Thank you for your leadership, especially on high-speed rail! In California, we love you dearly!

RAY LAHOOD

All the people in California that have been working on this for a couple of decades, and

Norm knows this as well as anybody, being a Californian, that California not only has been putting plans in place, but they've also been putting money in place. They passed referendums. They have a pot of money. They're ready to go, and that's the reason they received the largest amount of money for high-speed intercity rail, more than any other place in the country, thanks to the leadership of so many people in California.

ROD DIRIDON

Mr. Secretary, we thank you very much, and we'll put that to work for you very quickly. One of my collateral duties is as a member of the High-Speed Rail Authority board, so I'll wear two hats in thanking you.

RAY LAHOOD

Yeah, well, good. Congratulations.

ROD DIRIDON

Let's begin, though, by going in reverse order to the schools. Since we have about 15 minutes, each one of the schools can ask one short question, and we ought to be able to get through the schools in the time left for us. How about Riverview Middle School, Bay Point, California for the first question?

RIVERVIEW MIDDLE SCHOOL

How will transportation improve in the future?

RAY LAHOOD

Well, the high-speed rail, which many states, many regions of the country don't have, such as California and places like Florida, and even in the Midwest, where we have some high-speed rail, we don't have all that we want.

We also are working with our friends in the aviation business to get them some new technology so that we can fly planes in and out of airports more efficiently, more safely. We call that next-generation technology, putting the highest form of technology, the highest form of computers, into airplanes, and also at the airports, so planes can be guided in and out of airports very safely, very carefully, save a lot of jet fuel. That's something that's on in the future for aviation.

We're working with the automobile manufacturers to make cars the safest they can possibly be, so that when people buy a car, they know it will be safe. And we're also working with the automobile companies on making sure that when people are driving, they're driving

safely. That's the reason that we now have seat belts in every car. We have air bags in every car, and we have technology in cars that prevent accidents.

There are many different areas, whether it's with the automobile industry, with the railroad industry, with the airline industry, with the trucking industry, to really improve safety and make sure that when people are driving a bus, a school bus, or driving a big truck, or driving a car, or flying a plane, or a train, that we can activate all kinds of safety measures to make sure that all these forms of transportation are very safe. I would say that as we look to the future in every form of transportation, safety becomes number one—making sure that the equipment is safe, but making sure that the people that are driving the equipment, and using the equipment, are the best-trained that they can possibly be.

ROD DIRIDON

Thank you, Mr. Secretary. The next school would be Riverside Meadows Intermediate School eighth grade.

RIVERSIDE MEADOWS EIGHTH GRADE

What is your most concern about transportation today?

RAY LAHOOD

I would say safety is our biggest concern. We want to make sure that the pilots that fly airplanes are the best-trained, and that they're well-rested. That the airplanes that they're flying are well-equipped with the kind of equipment they need in order to make sure they are safe. That our train transportation, whether it's buses, or light rail, or other forms of transportation, are safe, and that the drivers are well-trained; and that when people get in an automobile, they will know that buckling up is number one, that putting their cell phone in the glove compartment is number two; making sure they're not drinking and driving. Make sure they keep their hands on the wheel and their eyes on the road. I would say safety is our number-one priority that we talk about around the Department of Transportation, in all forms of transportation, on a very regular basis.

RIVERSIDE MEADOWS, EIGHTH GRADE

Thank you.

ROD DIRIDON

Thank you, Mr. Secretary.

The next question would come from Riverside Meadows Intermediate School Seventh Grade. Seventh Grade?

RIVERSIDE MEADOWS SEVENTH GRADE

Hi. How much do you think, or want, transportation to change in the next decade?

RAY LAHOOD

Well, I think the answer to that is, it's what the people want. People want to make sure that the forms of transportation that they have are safe, are modern. The car manufacturers are making very high-tech cars now. The cars that people drive, the new cars, have a lot of computers in them to help them drive safely. The trains that are being driven today, particularly the newer trains in the cities, the transit and buses, are some of the best that are being made now, and we want to make sure that people are well-trained for those. And so, really, having good, modern transportation, but also having people that are well-trained and know the safety aspects of these forms of transportation, will continue to be our priority.

ROD DIRIDON

Thank you, Mr. Secretary. Redland Middle School, Rockville, Maryland, will be the next presenter. Redland?

REDLAND MIDDLE SCHOOL

With the clunker plan so successful, do you think you will continue it each year?

RAY LAHOOD

That is a great question. Last year, when it was very hard for car dealers to sell cars because the economy was so bad, people really did not want to use their money to buy a car, so people were driving their cars more miles, more pollution, and they were racking up more miles, and all the new cars were sitting with nobody buying them. Congress decided to help give an opportunity to people to buy a new car, which helped the automobile manufacturer, the car dealer, the car salesman, the banker who loaned the money, the local governments who got the sales tax from the cars, and it helped sell 700,000 cars.

So Congress passed a bill called "Cash for Clunkers," and what that meant was, that if you had a car that had a lot of miles on it, and you wanted to trade it in and get a new car, you could take your car in, and if it was getting bad gas mileage, which meant 18 miles per gallon or less, and you traded [it] in for a car that would get 18 miles per gallon or more, you would get $4,500 from the car dealer against the price of a car, and then, sometimes they would give you even more money off. So, within 30 days, car dealers all over America

sold 700,000 cars, which really helped our economy, helped the car manufacturers, and really helped people who were selling cars, because they hadn't seen anybody in their showrooms. And we took a lot of cars off the road that were gas-guzzlers, so we got a lot of dirty burning cars off the road, called "clunkers," and they went to the junk yard, and all these new cars came on the road, which get better gas mileage, with better fuel efficiency, and so it was a big boon.

Now, to answer your question, I wanted to make sure everybody knew what the cash for clunkers was about. So you go in, and you buy a car, you get $4,500 right off of the price of the car. That's a lot of money. And so that program was very successful, and Congress passed that. It cost $3 billion to pay for that program, and so it will be up to Congress to decide if they want to do it again. We can't decide that here. If Congress decided they wanted to do it, and passed a bill for more money, then we would help get that program going; but, for now, Congress has said that they're going to use other ways to help people get back to work.

ROD DIRIDON

Thank you, Mr. Secretary. We have two more schools to ask questions in five minutes, so we have to be brief.

The next question is from Morada Middle School in Stockton, California.

MORADA MIDDLE SCHOOL

What new transportation idea has the transportation department [come] up with?

RAY LA HOOD

I would say that we're putting a lot of emphasis on high-speed rail, which I've talked about, which, in California, is going to be very popular. We sent the largest amount of money to California, a little over $2 billion. I would say that also good buses, light rail, and any forms of transportation where people can get out of their cars, get out of congestion, get on a bus, get on a light rail, take it to the airport, take it to work, take it to the grocery store, and it's a good form of transportation, and a lot of people then do not have to buy gas for their cars, and they can get out of congestion. And so we're working very hard with our friend, Bill [Millar and APTA], on some of these opportunities, and we're also working with the car manufacturers on getting better gas mileage. We're actually requiring them to get better gas mileage. So we're working on high-speed, more bus transportation, more light rail, and better gas mileage for cars.

ROD DIRIDON

Thank you, Mr. Secretary. The last school is Kemps Landing Magnet School from Virginia Beach, Virginia.

KEMPS LANDING

The United States is working diligently toward creating more fuel-efficient vehicles for the general public. However, efficient options cost in excess of $1,300 per vehicle, according to President Obama last May. This increase in price makes it progressively more difficult for the average American family to pay the extra money. How does your department plan on reducing these costs for consumers?

RAY LA HOOD

Well, one of the things that car manufacturers are doing, not only making more fuel-efficient cars, which get CO2 out of the air and really improve the opportunity for us to clean up the air, and have clean-burning automobiles, and automobiles that get better gas mileage, is by car manufacturer rebates back to the buyers of these cars some money to help defray some of the costs. Some of these new methods can be a little more expensive So some of it will be through the car manufacturers actually giving people a better break on the price of the car, which will encourage people to buy more fuel efficient, less gas-guzzling vehicles, and that's probably the main way that we can do it. The car manufacturers are going to be manufacturing cars that get much better gas mileage because we've set much higher standards in the future, and some of the money can be recouped by the car manufacturers' actually giving people a little bit of a break in the form of a rebate on the car when they buy it.

Let me just say thank you to all of you for your interest in transportation, to Secretary Mineta for his leadership in this program, to Bill Millar for his leadership in the program, and to all of the students for your interest in transportation. We look forward to being with you again. Thank you very much.

ROD DIRIDON

Thank you, Mr. Secretary. It's a unique opportunity to have the current secretary of transportation and the immediate-past secretary of transportation here sharing their time with these students, and allowing them to have a perspective on challenging job opportunities for the future.

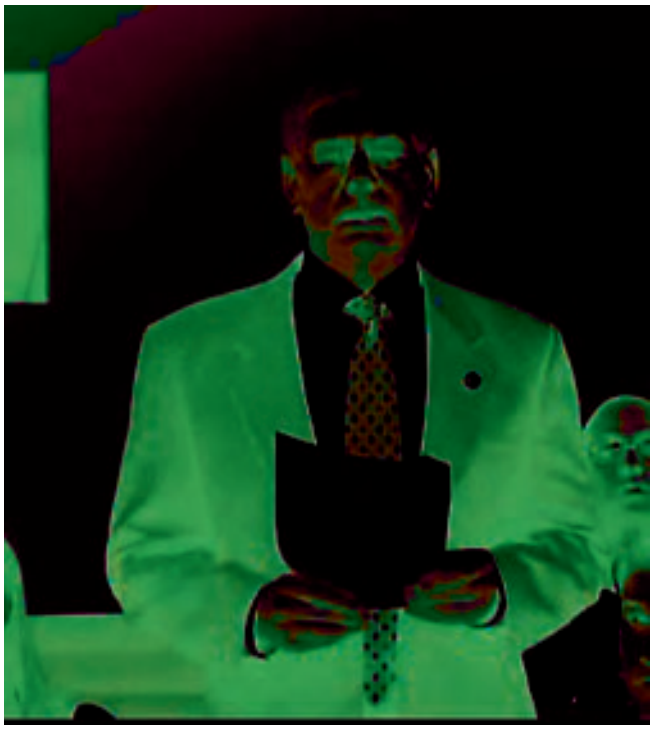


Figure 15 Rod Diridon at the Conclusion of the Event

Now all you have to do, youngsters, is take the technical courses in high school—that's math and science—so that you can take the career-type education in college; that's civil engineering, planning, business, and so on, so that you can begin doing the kinds of things that Secretary LaHood suggests will be the future of our national transportation systems.

So a special thanks to Secretaries LaHood and Mineta. A special appreciation to APTA president and MTI chair, Bill Millar, and to each one of the class sponsors, the site sponsors, each one of the teachers, and each one of the classes that presented today. The four evaluators will carefully review their evaluation sheets, tally the numbers that have been put down for each one of the elements of the presentations, and that will be announced within the next two weeks. We will identify both a winner and runner-up, and both will receive prizes.

The winning school—the teacher, the lead student, and a parent—will be invited to attend the Mineta Transportation Institute's annual banquet on June 26th. You will see the graduation of our Masters of Science and Transportation management, and be associated with about 400 of the nation's top transportation leaders, in San José. That information will be provided to each of you in the next two weeks.

There are no losers today. Each one of you provided outstanding presentations, and we know that you're going to go on to create wonderful things for the world of transportation, and so we appreciate your involvement, and we appreciate the support, especially of

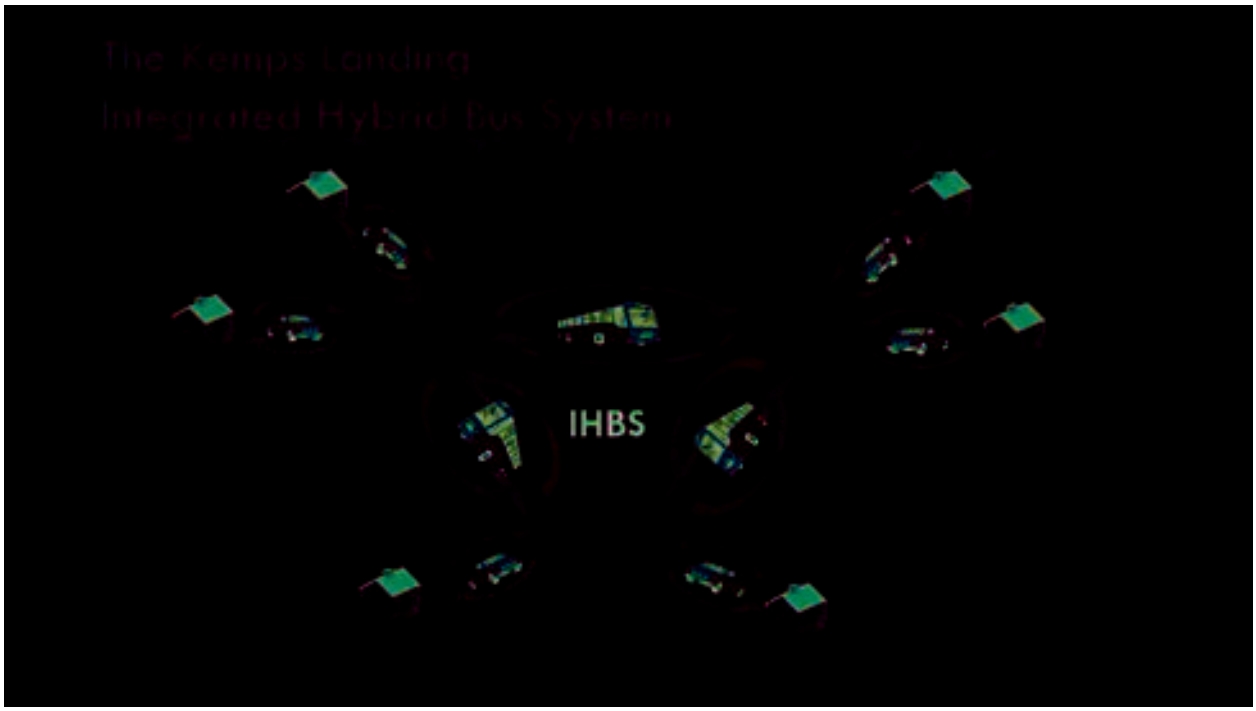
Caltrans, and people like Bijan Sartipi, who is the director of Caltrans District 4, who stayed through the whole presentation here in Oakland. Thank you to Donna and her staff for the hard work that went into this. We will be adjourned then until next year at about this time, when we will conduct the 11th Mineta Transportation Institute's Garrett Morgan National Videoconference Symposium. Thank you for being with us.

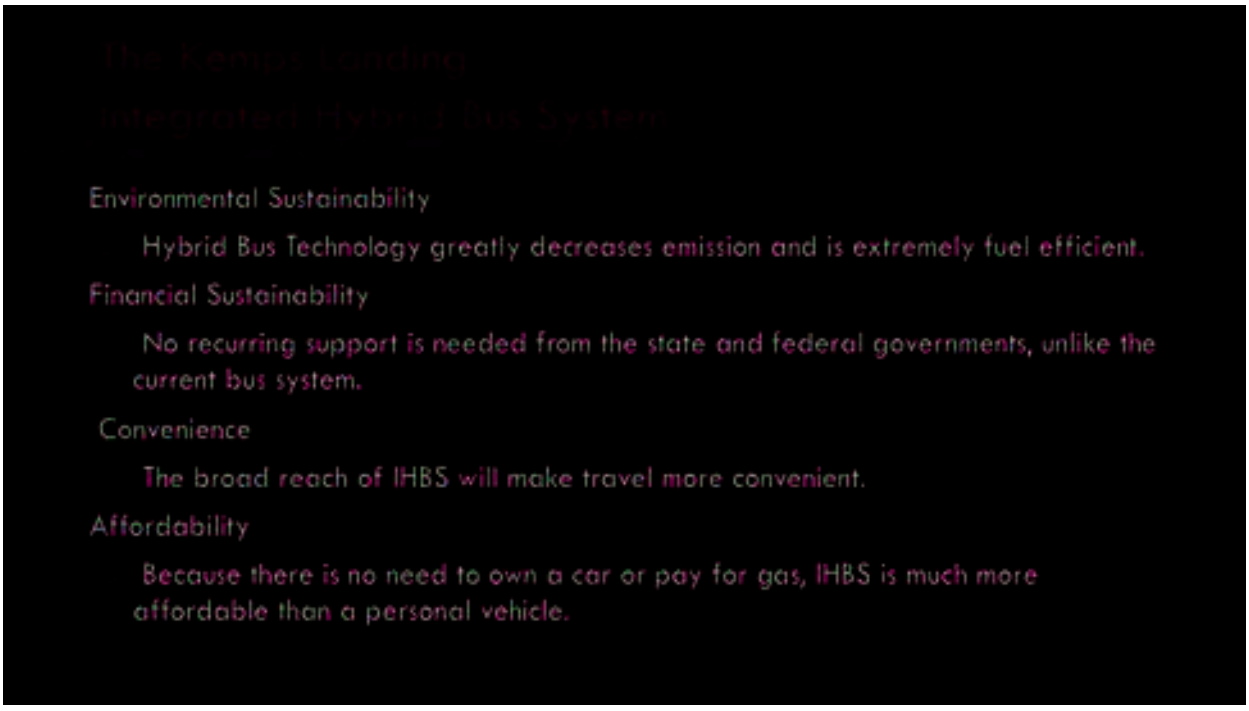
APPENDIX A: WINNING PRESENTATION

Kemps Landing Magnet School, Virginia Beach Virginia

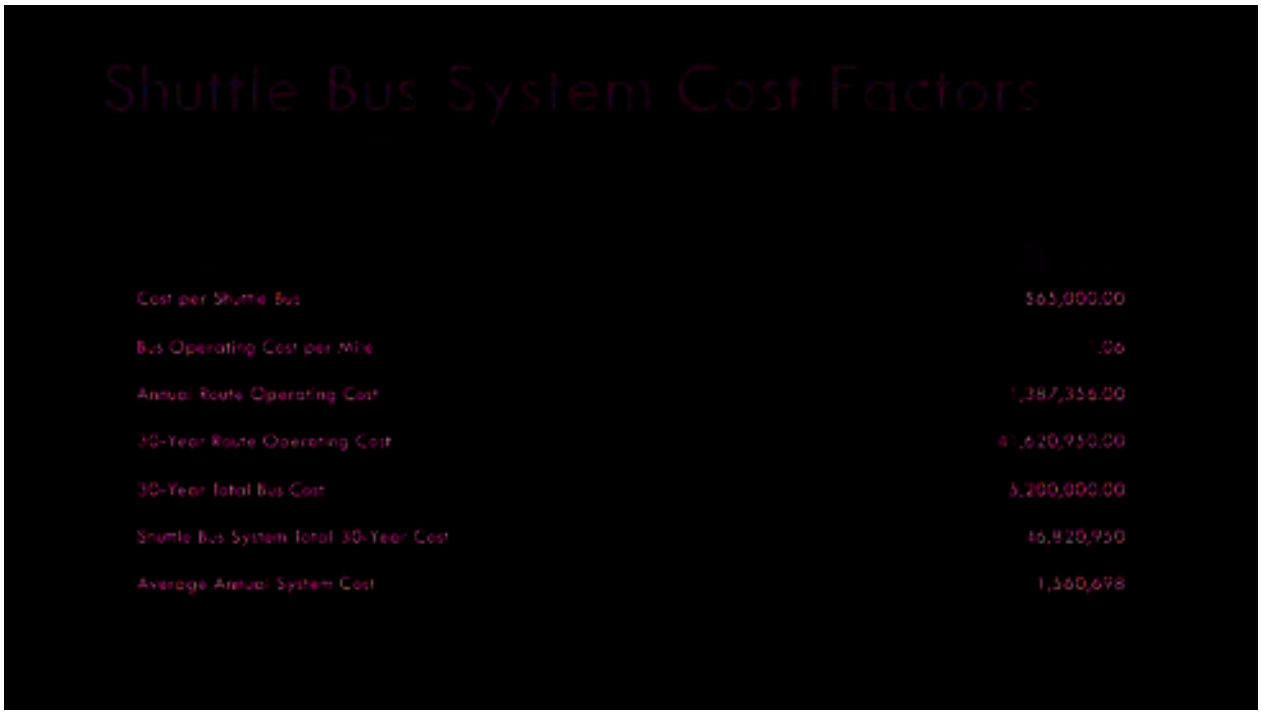
Teacher: Dennis Borgerding

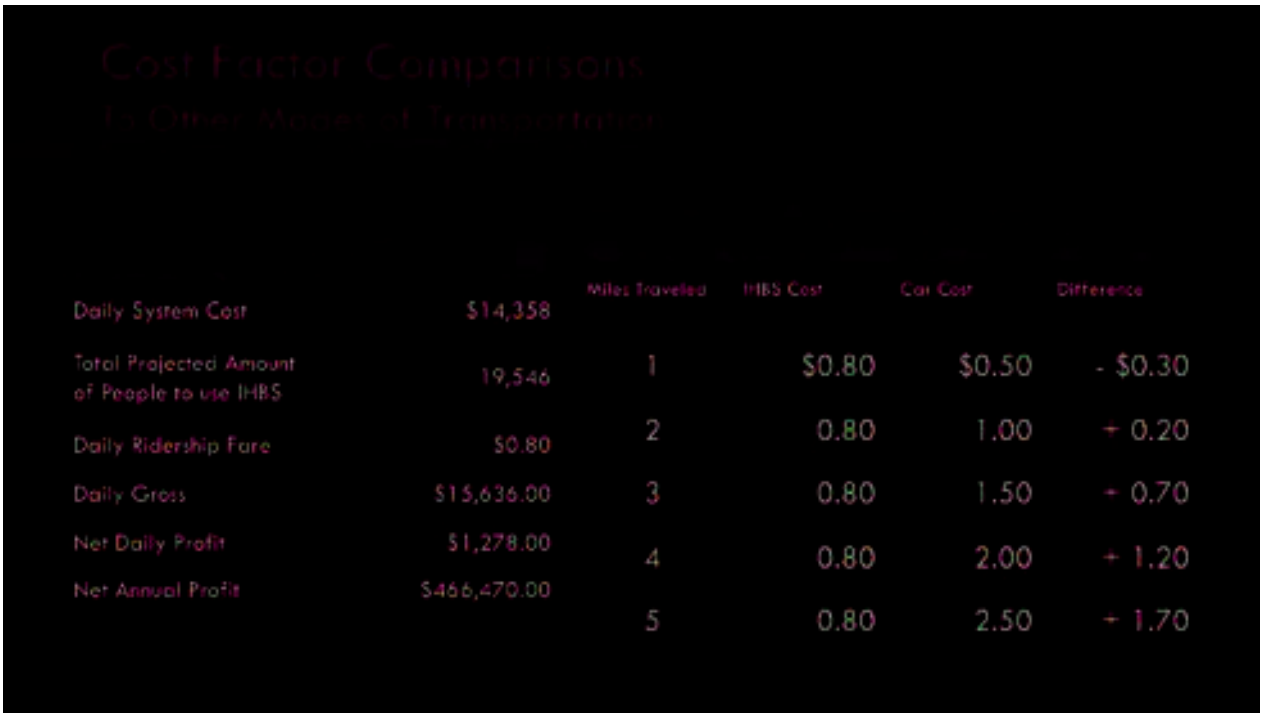
Students: Celine Brass, Zach Burkart, Gary Chen, Anita Desai, Lucy Fitzgerald, Emily Gimlin, Ethan Grogan, Kevin Hu, Ashlee MacDonald, Nicole Saks, Stephen Tang and Veronica Taylor


The Kemps Landing
Integrated Hybrid Bus System
IHBS


The Kemps Landing
Integrated Hybrid Bus System
Environmental Sustainability
Hybrid Bus Technology greatly decreases emission and is extremely fuel efficient.
Financial Sustainability
No recurring support is needed from the state and federal governments, unlike the current bus system.
Convenience
The broad reach of IHBS will make travel more convenient.
Affordability
Because there is no need to own a car or pay for gas, IHBS is much more affordable than a personal vehicle.


Large Hybrid Bus Cost Factors
Hybrid
Conventional
Difference
Cost Per Large Bus
$560,000
84 Bus Total Initial Cost
5,040,000
Operating Cost (30 years 84 buses)
52,164,000
+ 2,268,000
Total 30 Year Cost
$57,204,000
+ 588,000

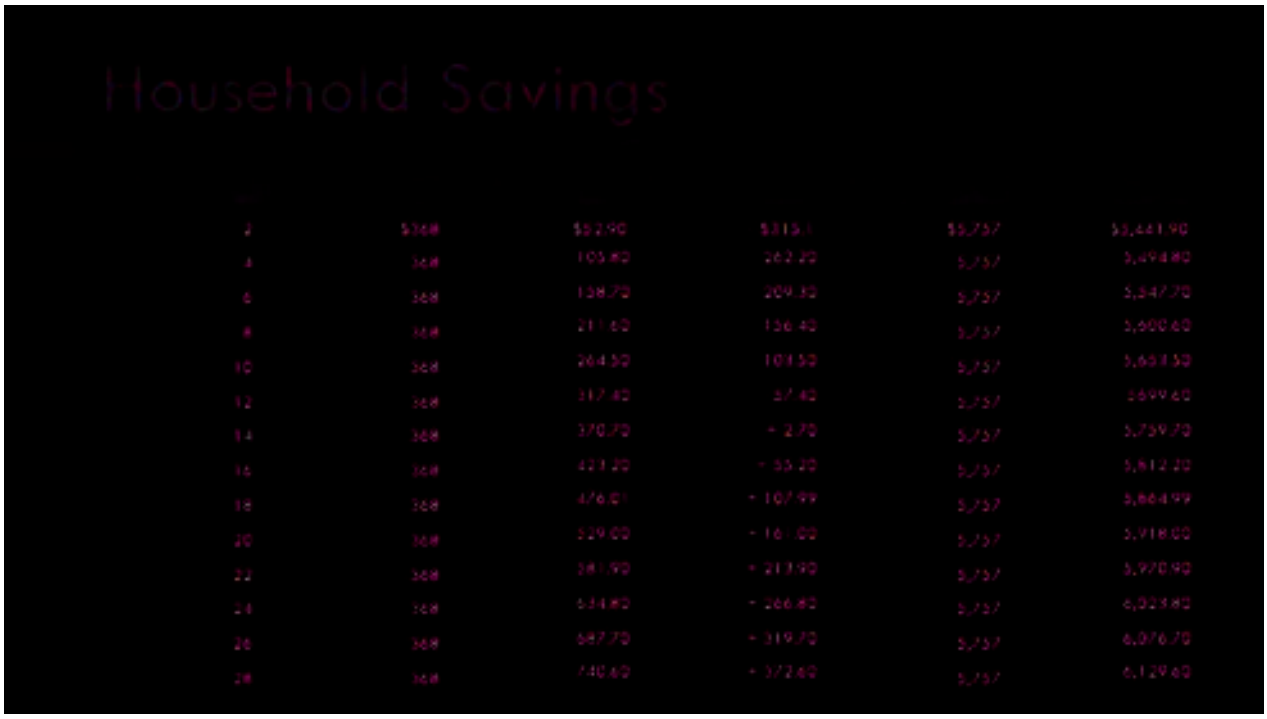

Shuttle Bus System Cost Factors
Cost per Shuttle Bus
$65,000.00
Bus Operating Cost per Mile
.06
Annual Route Operating Cost
1,387,356.00
30-Year Route Operating Cost
41,620,950.00
30-Year Total Bus Cost
5,200,000.00
Shuttle Bus System Total 30-Year Cost
46,820,950
Average Annual System Cost
1,560,698


Cost Factor Comparisons
To Other Modes of Transportation
Daily System Cost $14,358
Total Projected Amount of People to use IHBS 19,546
Daily Ridership Fare $0.80
Daily Gross $15,636.00
Net Daily Profit $1,278.00
Net Annual Profit $466,470.00
Miles Travelled IHBS Cost Car Cost Difference
1 $0.80 $0.50 - $0.30
2 0.80 1.00 + 0.20
3 0.80 1.50 + 0.70
4 0.80 2.00 + 1.20
5 0.80 2.50 + 1.70


Cost Factor Comparisons
To Other Modes of Transportation
Daily System Cost $14,358
Total Projected Amount of People to use IHBS 19,546
Daily Ridership Fare $0.80
Daily Gross $15,636.00
Net Daily Profit $1,278.00
Net Annual Profit $466,470.00
Construction Cost per Mile $45,700,000
Starting Cost (11 Miles) 502,700,000
Annual Operating Cost 5,500,000
30-Year Operating Cost 165,000,000
30-Year System Total 667,700,000
Difference to IHBS + $611,084,000

Household Savings

	IHBS	Personal Automobile	
Automobiles Needed	1	2	1
Average Price Ea.	$27,958	$27,958	$0
Total Money Spent	27,958	55,916	+ 27,958
Avg. Annual Price (13 yrs)	2,150	4,301	+ 2,150
Annual Maintenance and Insurance Cost	2,136	5,742	+ 3,606
Annual Price (w/o fuel)	4,286	10,043	+ 5,757



APPENDIX B: ABOUT GARRETT MORGAN

GARRETT AUGUSTUS MORGAN, 1877–1963

Garrett Augustus Morgan, for whom the U.S. Department of Transportation Technology and Transportation Futures Program is named, was born in Paris, Kentucky, in 1877. The seventh of 11 children, his parents were former slaves. Although his formal education ended at the sixth grade, Garrett Morgan went on to become a world-famous inventor and entrepreneur.

Figure 16 Garrett Augustus Morgan as a Young Man

Despite his humble beginnings and lack of formal education, Mr. Morgan made an impact on the course of human events. Shortly after his death in 1963, Morgan was awarded a citation by the U.S. government for his significant inventions.

In 1923, Mr. Morgan invented and patented a successful early traffic signal. It was during this time that the automobile was becoming common, sharing the nation's streets with bicycles, horse-drawn vehicles and pedestrians. Collisions were frequent and often bloody. After witnessing such an accident in Cleveland, Ohio, Mr. Morgan decided to invent a device to make the flow of traffic safer. The Morgan traffic signal was a T-shaped pole topped with three illuminated signs: stop, go and an all-directional stop that let pedestrians cross the busy street.

At night, or when traffic was minimal, the Morgan signal could be positioned in a half-mast posture, alerting approaching motorists to proceed through the intersection with caution. This technology was the basis of the modern-day traffic signal and was a significant contribution to what we now know as Intelligent Transportation Systems.

The Mineta Transportation Institute presents an annual symposium by videoconference as part of its ongoing mission to provide technology transfer, education and research on current issues and emerging solutions in the field of sustainable surface transportation. The videoconference is part of the Garrett A. Morgan Technology and Transportation Futures Program, which was established by the Honorable Rodney Slater, former secretary of the

U.S. Department of Transportation.

Figure 17 Garrett Morgan's Traffic Signal

Teachers and students address the topic of sustainable transportation and propose innovations for the surface transportation industry. The purpose of the symposium is to stimulate the minds of young people and encourage them to excel in mathematics and science, which could lead to careers in transportation engineering, transportation planning, environmental science, public transportation, and innovations in transportation safety and security.

Through the efforts of many people, this event and this publication will add to the positive spirit of innovative transportation progress so ably personified by Garrett Augustus Morgan.

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Department of Transportation